TECHNOLOGY DEPARTMENT

FLIGHT

SEPTEMBER 1954
35 cents

MAGAZINE

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SEP 16 1954
V42 #3

URANIUM DISCOVERIES BY AIR

(See page 20)

America's first Jet Transport

...designed and built by Boeing

...air-conditioned by Stratos

The successful first-flight of the Boeing 707 jet transport marks an important milestone in the progress of commercial aviation. Biggest and fastest civil jet transport, the 707 is also designed to serve the Armed Forces as a jet tanker capable of matching speed and altitude with modern military aircraft.

It is pioneering spirit like that shown by Boeing that has enabled the U. S. to gain and hold world leadership in the Air. Stratos is proud to have worked with Boeing on this Stratoliner—Stratotanker and to have designed and produced the air-conditioning system for America's first jet transport.

AIR-CYCLE REFRIGERATION PACKAGE BUILT FOR THE 707

AIR MOISTURE SEPARATOR USED IN BOEING 707

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A DIVISION OF FAIRCHILD ENGINE & AIRPLANE CORP.

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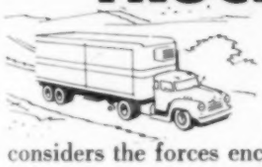
TEN TIMES STRONGER THAN TRUCK WHEELS OF SAME WEIGHT!



Once an airplane touches the ground, it is out of its element. That is where its wheels take over a task which is truly Herculean, when one considers the forces encountered.

Airplane wheels must withstand pressures of 1000 pounds per square inch—and more—in order to qualify for this exacting service.

Compounding the problem is the fact that the rotating disc of the brake mechanism is geared to the wheel structure. So the wheel must transmit the torque generated by the retarding action of the brake.

Moreover, the wheel must be able to withstand the tremendous demands of tire pressure, shock loading, static loading, side loading and torque loading—often in simultaneous combination.

All this must be engineered into the airplane wheel — *a structure which must, above all, be exceedingly light for its size and capacity!*

In the past ten years, Goodyear research has advanced the design of airplane wheels from 190 pounds average load capacity per pound of wheel *to 250 pound capacity*. It has pioneered the "wave-type" design which is easier to cast and machine — has utilized strain gauge, stress coat, load machines, burst and flight tests—constantly researching and *finding* new ways to improve upon one of man's oldest inventions—the wheel—for the betterment of aviation progress.

Goodyear, Aviation Products Division
Akron 16, Ohio or Los Angeles 54, California

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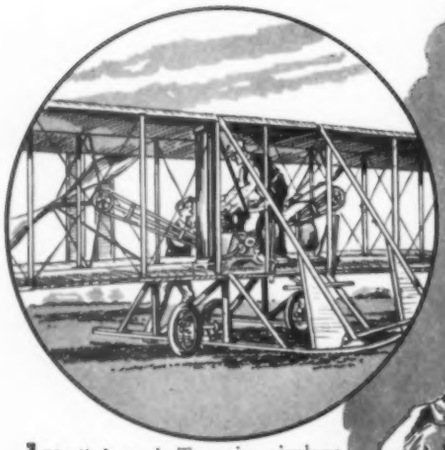
PRODUCTS

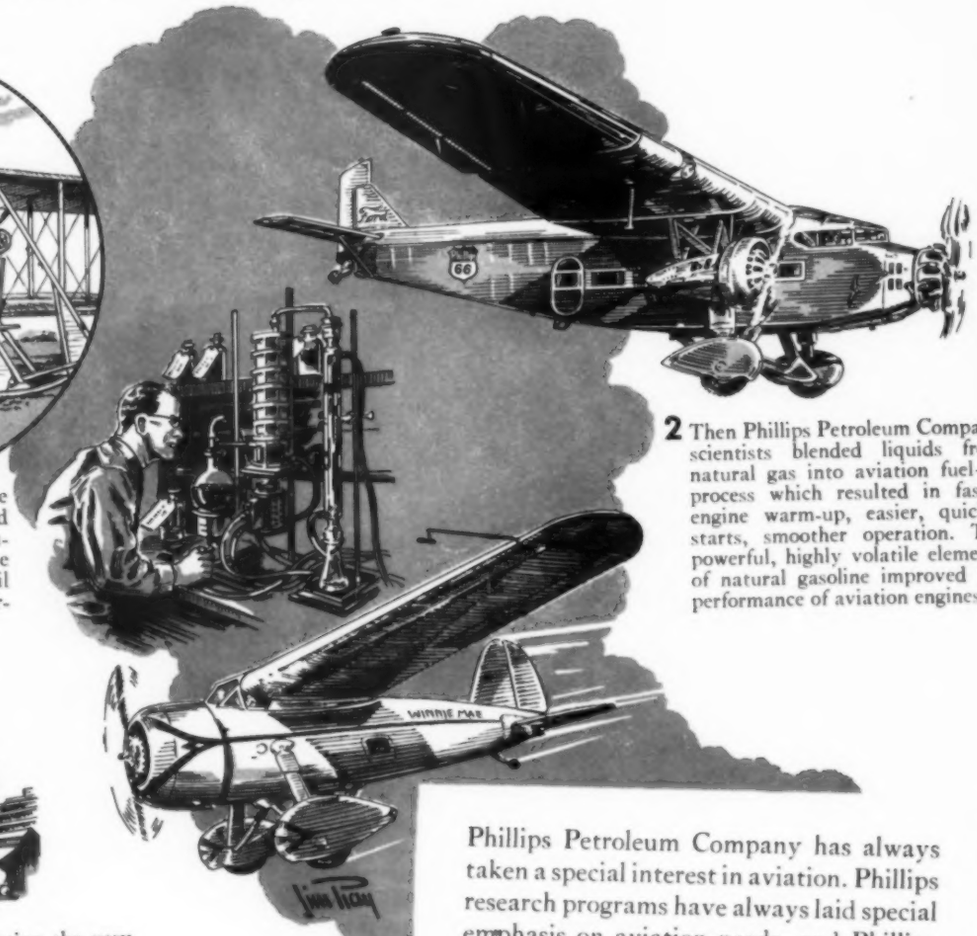
FACILITIES + ABILITIES = EXTRA *plus* IN PERFORMANCE

MILESTONES IN AVIATION

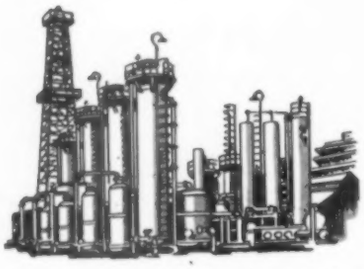
How Phillips 66 Pioneered in High Test Aviation Fuel



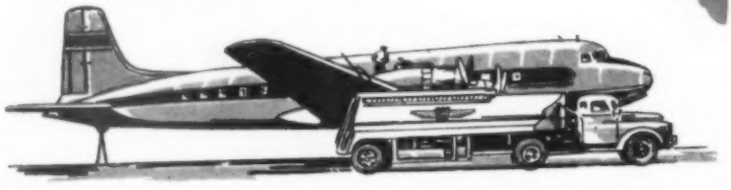
1 Until the early Twenties, airplane engines were often started in cold weather by using ether in a priming cup built into the intake manifold. Engines sputtered until they became hot enough to vaporize regular gasoline.



2 Then Phillips Petroleum Company scientists blended liquids from natural gas into aviation fuel—a process which resulted in faster engine warm-up, easier, quicker starts, smoother operation. The powerful, highly volatile elements of natural gasoline improved the performance of aviation engines.



3 In 1942, Phillips put in operation the very first HF alkylation plant—for the production of HF Alkylate, a high-power, high-performance aviation fuel component.



4 Today, Phillips produces tremendous quantities of 115/145 grade aviation gasoline for commercial and military use.

Phillips Petroleum Company has always taken a special interest in aviation. Phillips research programs have always laid special emphasis on aviation needs, and Phillips took an active part in the early, crucial setting up of standards for aviation fuels and lubricants. Phillips research and manufacturing have led the way in the production of many of the major ingredients of aviation gasolines.

Today, Phillips Petroleum Company has the highest yield of aviation gasoline per barrel of crude oil processed.

Operators know they can always depend on Phillips *66* aviation products, long noted for highest quality.

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PHILLIPS PETROLEUM COMPANY
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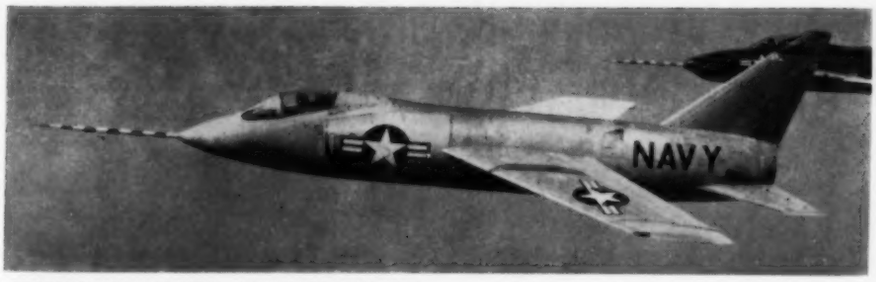
Phillips 66

AVIATION PRODUCTS

AIR Report
Significant Trends and News



SUPERSONIC SPEEDS IN LEVEL FLIGHT are attained by the Navy's new Grumman F9F-9 Tiger, first flown last month by Grumman Aircraft Engineering Corp. less than 15 months after design go-ahead was given by the Navy. It is powered by a Curtiss-Wright J65 Sapphire axial-flow jet with afterburner. Grumman says simplicity features the design with "coke bottle" fuselage. Navy order for Tigers totals $40,000,000.
—(Grumman Photo.)

CESSNA HAS CEASED PRODUCTION OF ITS MODEL 190 SERIES, having turned out 1,059 of the 5-place design from 1947 through June, 1954. Final unit was a 195 rolled off the line early in September.

MOONEY'S NEW MODEL 20 FOUR-PLACE is expected to be in the air Sept. 15, with production deliveries next March. Improvements include increased cabin space, better soundproofing and a Horton & Horton interior. New and larger acccess door makes for easier entrance and exit. Front seats are on rollers, similar to those in Cessna 170, with five positions. Target price is $12,500 fully equipped except radio. Mooney plans to license it with 150-hp. Continental and 150-hp. Lycoming engines. Fuselage from baggage compartment aft will be all-metal. A new experimental single-seater is also in the works, using the old Model 19 prototype fuselage and a new 90-hp. Continental engine. Deliveries of the 65-hp. single-seater Model 18 were resumed last month at Kerrville, Texas.

CESSNA NOW LISTS 250 MPH. FOR DESIGN CRUISING SPEED of its 4-engine, pressurized Model 620 executive transport. When announced last month, 235 mph. was cited as cruising speed. For details of Model 620, see page 18 of this issue.

Lynn Bollinger personally delivered his **THIRD PRODUCTION MODEL HELIOPLANE** in Chicago last month.

CESSNA HAS PRODUCED 22,105 AIRPLANES since 1934, 14,001 since 1946. In the period 1934-40, it produced only 254 planes of which 212 were Airmasters and 42 twin-engine T-50's. For World War II during 1941-45, it delivered 640 Canadian Crane Trainers, 33 AT-8's, 4,687 UC-78's and AT-17's and 750 CG-4A gliders. Postwar deliveries during 1946-June, 1954, totalled 2,164 Model 120's, 5,406 Model 140's, 4,363 Model 170's, 1,059 Series 190 and 1,009 Model 180's. Post-war military deliveries have included 2,409 L-19 Bird Dogs and 83 LC-126's (military Model 195). In civilian post-war models, Cessna thus has sold about 6,500 four-place or larger aircraft and about 7,500 2-place models.

An interesting experiment will be made during the winter by a Piper Apache owner who intends to replace one of its 150-hp. Lycoming engines with **AN EXPERIMENTAL EIGHT-CYLINDER CHEVROLET ENGINE EXPECTED TO DEVELOP MORE THAN 200 HORSEPOWER.** Aluminum case and heads will be used, plus chroming of cylinders. With a compression ratio of 12½ to 1 the engine will be cooled by Prestone.

At its annual convention in Omaha last month the National Aeronautic Association voted unanimously to launch a study into the possibilities of reviving **THE AERO CLUB OF AMERICA,** predecessor organization to the NAA in the early 1920's. In recent years NAA membership has dropped to around 8,000, split about equally between members affiliated with local aero clubs and members-at-

(Continued on page 8)

FLIGHT MAGAZINE
Including SOUTHERN FLIGHT and MODERN AIRPORTS

SEPTEMBER, 1954 VOL. 42, No. 3

COVER: This excellent photo by Vic Goodwin of Cortez, Colorado, shows a Piper Super Cub flying the rim in uranium exploration on the Colorado Plateau. Pilot has to stay within 50 ft. of the rock outcropping, so that scintillation counter carried by geologist on back seat can pick up radioactivity given off by uranium ore. Piper Super Cub is top rim airplane on the Plateau because of its power reserve, and slow flying speed. Atomic Energy Commission operates 9 Super Cubs in rim flying. Private operators use dozens of them. Lightplanes engaged in uranium activities total 185 in number, using 125 small improvised air strips. For details, see page 20.
—(Photo by Vic Goodwin).

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Just Among Ourselves—EDITORIALS—"MUST" LEGISLATION; OLD FAITHFUL; OFF THE BEAM; ONE-FAN FLIGHTS TO EUROPE . 13

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GEORGE E. HADDAWAY, Editor-Publisher; TOM ASHLEY, Managing Editor; FRED N. STONES, JR., Business Manager, P. O. Box 750 (1901 McKinney Ave.), Dallas, Texas—Telephone STerling 2125.

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Private "air truck" for Very Special Delivery

...powered by Lycoming

When deliveries are *Rush* with a capital "R" . . . today's progressive businessman turns to a small company plane that relieves him of dependence on the schedules of commercial air-freight systems.

Take the case of the Capital City Printing Plate Company of Des Moines, Iowa . . . operator of a Piper Tri-Pacer powered by Lycoming. Gene C. Meston, General Manager, says: "We could not maintain our production and sales level without the Tri-Pacer. The airplane and the pilot do the work of two trucks and three drivers. We save a lot of expense and keep our customers well satisfied."

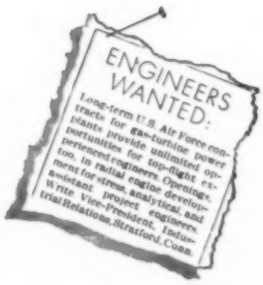
Our own experience at Lycoming with the Tri-Pacer is a revelation in dollars and cents. It carries a 500-lb. payload at an operating cost of only 5.6¢ per mile . . . *less than the average cost of running an automobile!*

For the "air truck" in *your* future, test-fly a Piper . . . or one of the other leaders in this small-plane field that fly with dependable Lycoming air-cooled engines.

Off again to deliver the goods! Tom Vodenik, Capital City pilot, shown here, says: "We logged over 750 hours in the first eight months we flew this Tri-Pacer. The plane has had nothing but routine maintenance—it's ready to go every day!"

the Lycoming story

Just off the press! "The Lycoming Story" . . . 40 interesting, illustrated pages showing many ways Lycoming is ready to help you. Write for it on your letterhead.


ENGINEERS WANTED:
Long-term U. S. Air Force contracts for gas-turbine power plants provide unlimited opportunities for top-flight experienced engineers. Operation, to radial engine development for stress analytical, and assistant project engineers. Write Vice-President, Industrial Relations, Stratford, Conn.

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Manufacturing plants in Stratford, Conn., and Williamsport, Pa.

Here's aviation's best transportation value!

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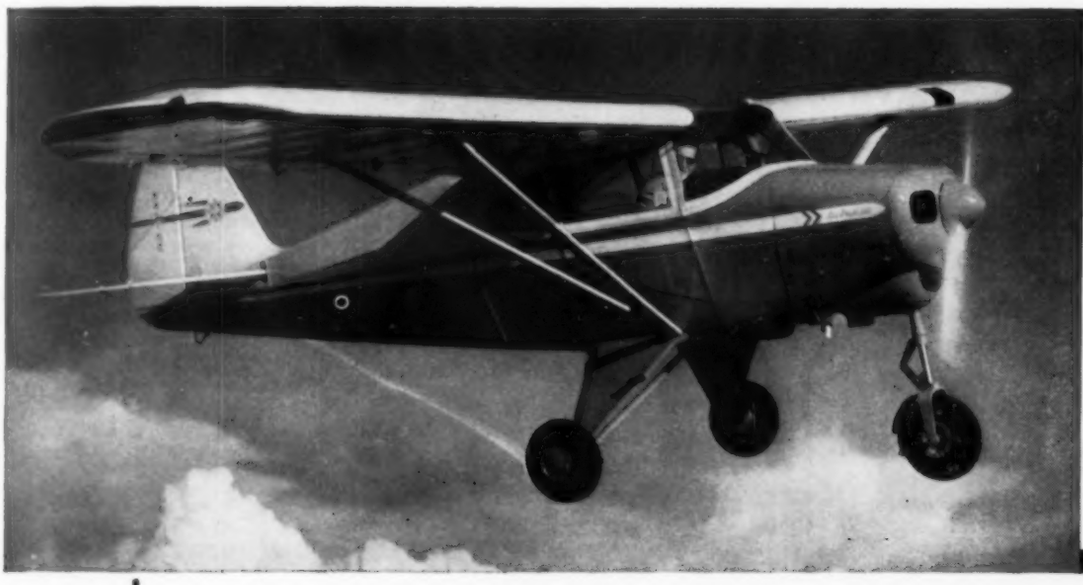
***Value*, plus performance, comfort and flying ease, explain why the Piper Tri-Pacer is the largest selling four-place business plane on the market today.**



$7075
complete
with radio and other Deluxe Equipment
F. A. F. Lock Haven, Pa.
Standard Tri-Pacer only $6475

Compare the price of the fast, easy-to-fly Custom Tri-Pacer with anything on the market. At $7075 here's a truly fine transportation airplane for the businessman with a long list of standard equipment including navigation lights, VHF transmitter, two-band LF receiver and accurate homing loop.

And in the Tri-Pacer you get nimble performance—over 120 mph cruise—plus traditional Tri-Pacer flight simplicity—tricycle gear for take-off and landing ease, simplified controls for flying ease.

With all these features and equipment, the Custom Tri-Pacer is still priced far less than any other 4-place production aircraft.

only $2830 down

You can start using the Custom Tri-Pacer with a cash outlay of only $2830, pay the balance on standard finance terms with full insurance. For details see your nearest Piper Dealer or send in coupon.

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PIPER Aircraft Corporation
Lock Haven, Pennsylvania Dept. 9-F

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See why so many pick PIPER

Compact Power for Modern Planes

Frontal area—and consequent drag—are reduced to an absolute minimum in Cessna's new Model 310. The Continental O470B within its close-fitting pod is less than 34 inches wide—less than 21 inches high.

CONTINENTAL MOTORS' REMANUFACTURING SERVICE SAVES YOU TIME AND MONEY

Continental's Remanufacturing Plan is another good reason for choosing an airplane with Continental power. This exchange service gives you a new factory-remanufactured engine—back to zero hours, and with factory engine guarantee—at a low fixed cost, with virtually no dead time.

Cessna's new Model 310 is truly a star performer, and Continental O470B's are two big reasons why. These modern-to-the-minute engines develop 240 h.p. each, but require minimum space, hence lend themselves ideally to modern plane design. Like the other models in this pioneer power plant line, they embody the results of specialized experience dating from 1902. Moreover, they're backed by service and parts wherever people fly.

TM REG.

Continental Motors Corporation
Aircraft Engine Division
MUSKEGON, MICHIGAN

AIR REPORT

(Continued from page 5)

large with no club affiliations. The study and recommendations will be turned over to the NAA executive committee and board of directors in mid-October for action. The proposal does not contemplate any change in present NAA structure but indicates that should the Aero Club of America be revived it would become an affiliate group of NAA, with membership in the Aero Club automatically including NAA membership.

BUSINESS AS USUAL IS THE ORDER OF THE DAY AT SOUTHWEST AIRMOTIVE'S mammoth operations on Dallas' Love Field despite the strike of some 170 members of the International Association of Machinists, AF of L, Lodge 1306, who struck August 5 for higher wages and additional fringe benefits totalling some 40c an hour. The company has offered some 5c hourly increase, and has advised union members that if they are not back on the job by September 1 they will be replaced by new employes. Hardest hit by the strike is SWA's motor overhaul division which is operating with a skeleton crew of 30 expert mechanics and supervisory personnel.

BEECH AIRCRAFT CORPORATION at press time was flight-testing No. 8 production model of its new Super 18. It grosses 9,300 lbs., 3,330 lbs. of which is useful load (including fuel and radio). At 67.7 per cent power (300 hp.), at 10,000-ft. altitude, the

(Continued on page 30)

THWARTED BY CANADIANS, who would not clear him for trans-Atlantic flight last month, Paul Smith of San Diego had to content himself with a 2,400-mi. nonstop flight from San Diego to Washington in his Cessna 170. It has 135 gals. of auxiliary fuel and a Javelin single-axis autopilot. Another Cessna 170 and a Beech Bonanza got by the Canadians earlier and made it across the ocean. Smith said he was not after publicity but wanted to make the hop to prove the effectiveness of the Javelin as a "wonderful aid to flying."

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Also available . . . a full line of specially designed BEECHCRAFT BONANZA ACCESSORIES: map and thermos cases, curtains, visors, breather oil separators, aileron trim controls, ten-gallon auxiliary fuel tanks, and breather oil separator with carburetor air filter oiler. Write Aircraftsmen today!

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CAMAIR 480

A SUPERIOR TWIN CONVERSION OF THE FAMOUS RYAN NAVION

Here is an entirely new concept of an executive aircraft with a combination of speed, safety and utility never before offered in its price class.

The Camair 480 is powered by two Continental O-470 B engines either of which is capable of sustaining flight above 8,500 feet at full gross weight.

Here for the flying executive is big airplane performance in a relatively small airplane at a substantial reduction in investment and maintenance cost.

PERFORMANCE DATA

Gross Load	3,930 LBS.
Cruise Speed 70% Power at 6,000 Ft.	192 MPH
Rate of Climb SL Two Engines	1,750 FPM
Rate of Climb SL One Engine	450 FPM
Service Ceiling Two Engines	22,000 FT.
Service Ceiling One Engine	8,000 FT.
Range	900 Miles
Wing Loading	21.3 LBS./SQ. FT.
Power Loading 480 HP	8.2 LBS./HP.
Useful Load	1,200 LBS.
Fuel	108 Gals.

AMERICA'S MOST POWERFUL LOW PRICED EXECUTIVE AIRCRAFT. COMPLETELY REMANUFACTURED BY

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Whilst the schoolbell bangs about its melancholy falltime summons, a spirited sprite—all tired out by the mere thought of formal education—hookifies in the sanctity of the ole swimmin' hole. Thus does hazel-eyed strawberry-blonde Ann Burchfiel, 21, 110 lbs., 5'6". On the other hand, when duties tire airplane tires, the answer lies in replacing them with rugged, reliable, long-lived B. F. Goodrich. Thus do safety-wise pilots everywhere. They similarly rely on other famous Goodrich products distributed by SAC, like tubes, deicer boots, fireproof hose, brakes and wheels.

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LOVE FIELD | DALLAS

Just among ourselves

EDITORIALS

"MUST" LEGISLATION

ON August 6 Secretary of the Air Force Harold E. Talbott asked the Congress to amend the Reserve Officers Training Act of June 3, 1916, in order to authorize flight instruction during the institutional phase of the Army and Air Force Reserve Officers' Training Corps programs, and to provide medical care, hospitalization, and death benefits for members of the ROTC of all services.

While this urgent request for legislation was made too late for action by the Congress that adjourned last month, it is "must" legislation from a national security standpoint and should be rushed through the next Congress as soon as possible. Chances are good for its passage since the Bureau of the Budget has interposed no objection.

Secretary Talbott's covering letter requesting the legislation gets right down to the meat of the proposition when he states that "flight instruction within the ROTC program is expected to provide a much needed incentive for development and stimulation of interest among cadets during the impressionable institutional phase. The flight instruction contemplated will not only provide a means prior to graduation from the ROTC for determining the qualifications and adaptability of cadets for additional flying training but will provide a positive means of insuring that only the most qualified students are commissioned, thereby reducing attrition during subsequent Air Force pilot training with consequent savings of money and manpower."

The draft of proposed legislation includes the following sentence: "The Secretary of the Air Force may provide, or contract with civilian flying or aviation schools or educational institutions to provide such personnel, aircraft, supplies, facilities and instruction, as are necessary for flight instruction of members of the ROTC in Army and Air Force units."

We assume that the Air Force Secretary favors contracting with commercial flight schools since past experience in CPT-WTS programs and in primary flight training contract schools overwhelmingly points to such contractual arrangements as the most efficient and economical.

Much ground work can be accomplished between now and January when the new Congress convenes. So significant and so important is this proposed legislation no stone should be left unturned to see that it goes through the legislative mill without delay so that the vital recruiting, screening and flight indoctrination aspects of the proposed program can get underway in 1955. The military establishment has too long neglected this important job of making Air ROTC a true air program. Secretary Talbott's request for legislation during the closing hours of the last Congress must not be permitted to die on the vine. Civil aviation's greatest danger right now is to make the assumption that the Air Force gets everything it asks for, and that there's no use to go to bat for this particular legislation. That would be fatal. If the Air Force thinks so much of the proposal why did the Secretary wait until it was too late to get action?

The time to strike a blow for flight training in Air ROTC programs is now — while congressmen and senators are at home. It is everybody's business — not just the military's.

OLD FAITHFUL

WE attended the ceremonies last month when the last B-36 was delivered to the U. S. Air Force. It was an impressive occasion primarily because never before in the history of this nation have we owed so much to a weapon that was never used in combat as we owe to the B-36, the world's mightiest intercontinental bomber.

The B-36 was conceived in the dark days of 1941 when it appeared England was doomed and we might be denied European bases for strategic air power. Seven years ago the first 36 was delivered to the Air Force. In 1949 Convair flew a B-36 more than 10,000 miles nonstop, making a 10,000-pound bomb drop at the halfway point. Last July the USAF's 11th Bomb Wing flew 21 B-36's to North Africa. Not long ago a B-36 dropped two 42,000-pound dummy bombs, or a total of 84,000 pounds, for the heaviest load of bombs ever carried by one airplane. Missions above 40,000 feet are routine for the behemoth of bombers.

We agree wholeheartedly with the school of air power thinking that our USAF's combat capability with such an airplane more than any other one factor has stayed the hand of the ruthless Soviets in their headlong rush for mastery of the world. At a recent briefing by Strategic Air Command officers at Offutt Air Force Base in Omaha, Nebraska, we learned that Old Faithful is still the backbone of our global counter-offensive air strategy and the new and modified models have capabilities and improvements far beyond the capabilities of models in combat readiness two years ago.

The newer jet bombers are coming along — many of them now ready for combat. But even though the jets will eventually replace the B-36, now that the last one has been delivered, it will be a long time before it's sent out to pasture.

The Convair company, the stalwart B-36 crews which are among the cream of our Air Force personnel, the Strategic Air Command and all those inside and outside the military establishment who have had a hand in the development, production and operational effectiveness of the great bomber that might never fire a shot in actual war, are due a sincere salute of gratitude and a hearty "Well Done!" from the freedom-loving people of the earth.

Surely there's a powerful germ of an idea in the lesson we must have

(Continued on page 36)

ALLISON POWERS THIS PILOTLESS JET BOMBER

Already on NATO assignment with the 12th Air Force in Europe, the Allison J33 Turbo-Jet-powered Martin B-61 Matador is an outstanding example of precision engineering.

Since its whole life involves only one "one-way trip"— both engine and missile were skillfully designed to deliver short-haul reliability at rock-bottom expenditure of man power, materials and money.

As America's first pilotless jet bomber, the Matador is a prime example of how Air Force and Industry work together to serve this nation's security, economy and well-being.

The Matador delivers more defense per dollar, uses fewer critical materials — uses electro-mechanical control in place of the pilot and crew.

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World's most experienced designer and builder of aircraft turbine engines — J35 and J71 Axial, J33 Centrifugal Turbo-Jet Engines, T38, T40 and T56 Turbo-Prop Engines

The Most Trusted Name in Ignition

First choice for light plane ignition

Over the years, Bendix ignition has been the choice of leading engine manufacturers and plane builders in the light plane field.

For example, Bendix magnetos are widely used by such outstanding engine builders as Continental, Aircooled and Lycoming, and are found on such popular types of planes as Beech Bonanza and Twin-Bonanza, Cessna 170, 180, and 310, Aero-Commander, Grumman Widgeon, Piper 135 Pacer, Tri-Pacer, and Apache, Riley Twin-Navion, and Ryan Super-Navion.

There is good reason for this widespread acceptance in the light plane field. Long experience in all phases of aviation has enabled Bendix to design magnetos incorporating every desirable feature of performance at prices compatible with light plane manufacturing requirements.

Again the ingenuity and facilities of the Scintilla Division demonstrate just why Bendix is The Most Trusted Name in Ignition.

S-50 SERIES

S-20 SERIES

SCINTILLA DIVISION
of Bendix
AVIATION CORPORATION
SIDNEY, NEW YORK

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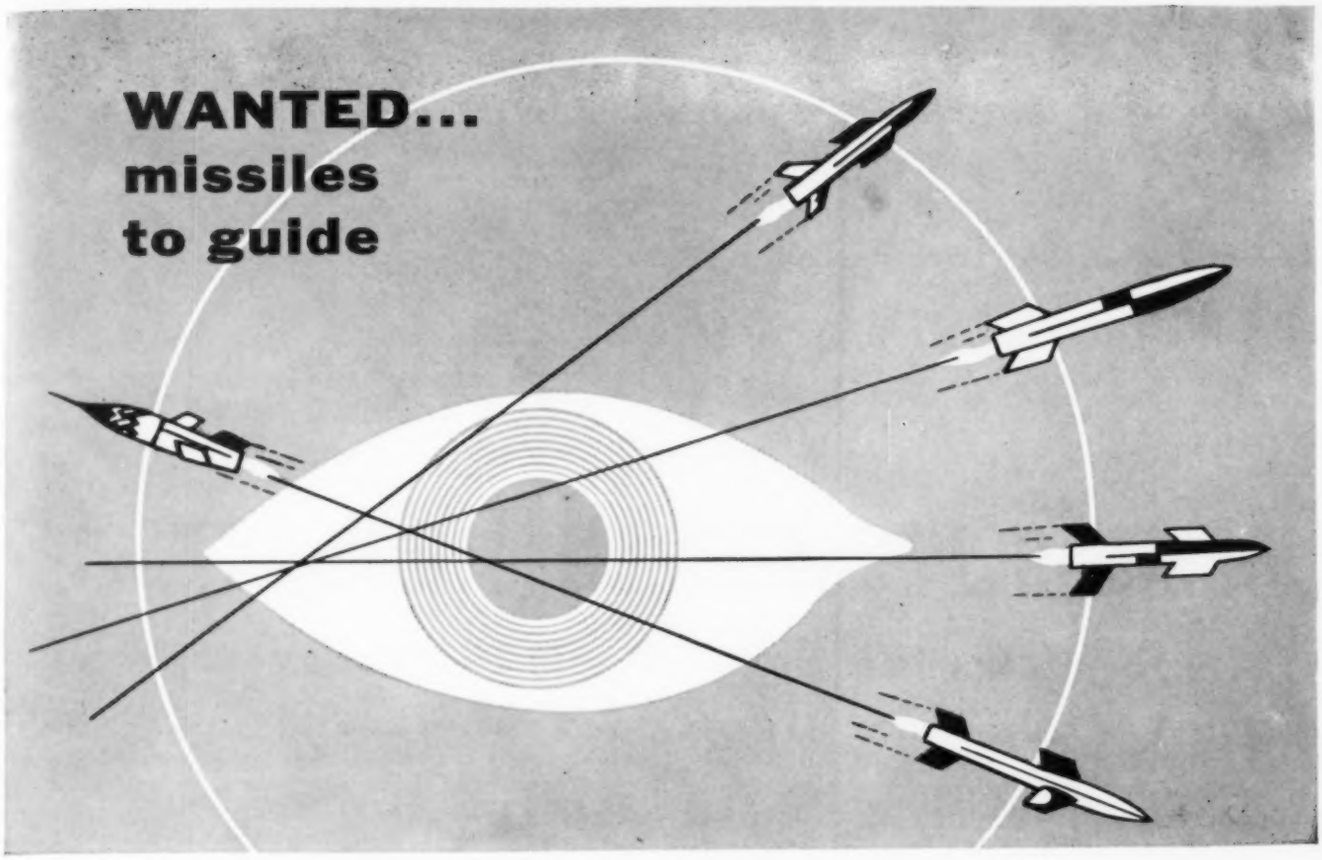

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First 4-engine aircraft designed for business flying by a major manufacturer is this Cessna Model 620. Cessna Aircraft Company says it will fly early in 1955. Engines are Continental Model GSO-526-A — a new 6-cylinder series geared and supercharged to hold 290 hp. each up to 15,000 ft., with 320-hp. for take-off.

Cessna's Pressurized Transport

First details of the 4-engine Model 620 for executive safety and comfort

CESSNA Aircraft Company has taken the long-awaited "big step" in multi-engine business plane development. It is building a prototype of a completely modern 4-engine, 8-to-10-place Model 620 with a pressurized cabin and other business-plane "firsts." It expects to fly the prototype as early as March, 1955.

No specific data on the Model 620 will be released by Cessna until it is CAA certificated under CAR Part 0.4b. However, design goals include a 250-mph. cruising speed at 15,000 ft. and an all-out range of 1,300 miles on about 400 gals. of fuel.

It is the first pressurized airplane developed for business flying. At 18,000-ft. altitude, inside cabin pressure is the equivalent of only 8,000 ft., providing airline-type comfort without the use of oxygen masks while flying at levels where optimum performance and smooth air are available.

It is also the first transport-type commercial airplane which features pressurization of a non-circular cabin cross-section. The Model 620 cabin interior is 6 ft. in height and 5.8 ft. wide at the window levels. Interior cabin length is 13 ft. 3 ins. between front and rear bulkhead doors.

AiResearch of Los Angeles worked with Cessna in developing a turbine pressurization unit for the Model 620. It not only provides cabin pressurization but heating and refrigerated air conditioning as well, being equipped with powerful blowers to provide complete cabin comfort in summer or winter while parked on the ground.

6-Cylinder Continental Engines

Key to the Model 620 design is a new 6-cylinder "flat" engine developed for it by Continental Motors. It has 526-cu. in. displacement and has a geared propeller drive with a single-speed, centrifugal, gear-driven supercharger. Designated as Continental's Model GSO-526-A, the new engine is rated at 320 hp. maximum for take-off at 3,000 rpm. It has a METO rating of 290 hp. at 3,000 rpm. and can maintain this rating up to 15,000 ft. Cruise settings will use 2,300 to 2,600 rpm. Exhaust augmentor tubes will be used.

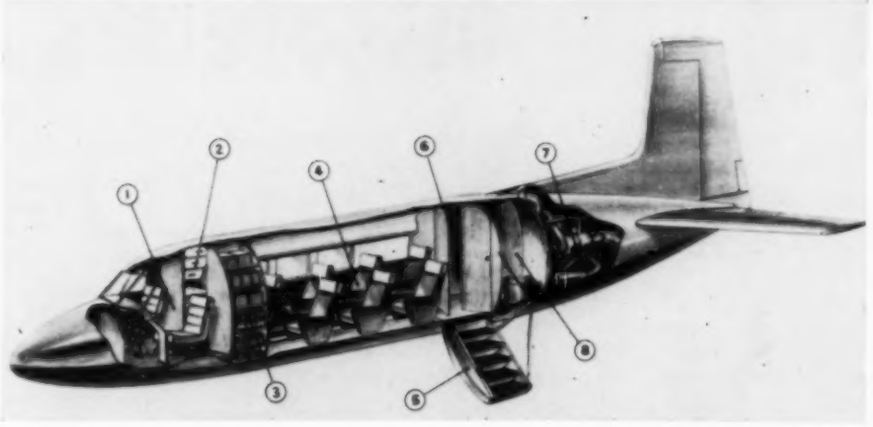
These engines are scheduled to be shipped to Cessna this fall, probably in November. They will drive 3-bladed constant-speed, full-feathering propellers. Meanwhile, construction of the prototype is proceeding on schedule and the firm is confident of flying the new airplane in the spring of 1955.

Design Performance

Performance goals include take-off

Pressurized cabin of Cessna Model 620 is 13 ft. 3 ins. long between bulkhead doors, 5.8 ft. wide at windows and has 6-ft. ceiling. Photo shows elaborate full-scale mock-up at factory. Seating here is for 6 persons, with crew of 2. Alternate seating is for 8 passengers.

Tip tanks are standard on the new Cessna, and augment interior wing tanks located outboard of the inboard engines. Fuel capacity is about 400 gals. for all-out range of 1,300 miles. Note large cabin windows, measuring 16 by 30 ins. Cabin cutaway numbers refer to features as follows: (1) Roomy cockpit with 15 by 23-in. bird-proof window panels; (2) galley for food and refreshments; (3) air carrier racks for radio and electronics; (4) cabin seats mount on metal tracks and can be spaced at one-half-inch increments entire length of cabin; (5) cabin door has built-in steps; (6) storage for 500 lbs. of luggage; (7) AiResearch turbine pressurization unit which also heats and refrigerates cabin air in flight and on ground; (8) large washroom with running water.



over a 50-ft. obstacle in less than 2,000 ft., at gross loading. This weight has not been revealed. However, it will include crew of two and six to eight passengers with generous baggage allowance, 275-lb. allowance for radio and navigation equipment, and about 400 gals. of fuel with required oil. With one engine inoperative, service ceiling is 23,000 ft.

Price range of the Model 620 will be about $300,000 including pressurization and other features. It is too early in the development for Cessna to nail down a specific cost or sales price figure.

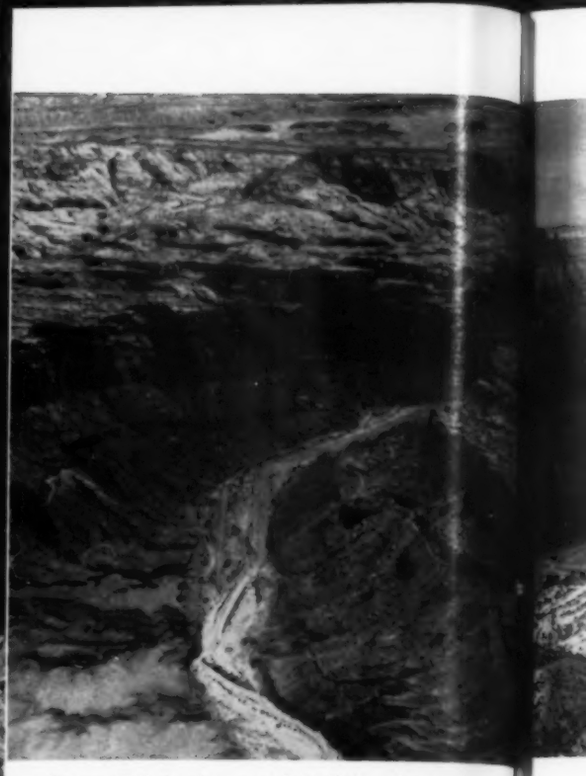
Marketing plans will be based on results of a comprehensive market survey expected to be completed this year.

How the corporate-owner multi-engine market will react with orders is not known. The Model 620 represents a developmental investment of something like $6,000,000 and Cessna officials are confident they have the answer to the current air transportation problems of most multi-engine aircraft users. Some executive pilots have voiced their ideas of the "ideal" or "dream" plane for their needs but these usually deal in such terms as 300-to-400-mph. and more for cruising speed, jet engines and 3,000-mile range. Aircraft manufacturers who have spoken on the subject describe such dream designs as being impractical because of developmental cost estimates ranging upwards of $18,000,000 and unit prices ranging upwards of $800,000 each.

Ralph Harmon Heads Project

Be that as it may, Cessna is going ahead with confidence in its 250-mph. airplane with its conventional piston engines of volume-produced flat design. The man in charge of the project is Ralph Harmon, who rose through the engineering ranks at Beech Aircraft Corporation, which he joined in 1939, to become assistant chief engineer before he transferred over to Cessna last year. Harmon did most of the design work in development of the Beech Bonanza, which has become the world's most aerodynamically efficient and widely-used 4-place business plane. Competition will be shooting at the Bonanza design for years to come and Harmon hopes the same

(Continued on page 46)



Super Cub is shown at left flying the rim up close. Canyon above contains Vernon Pick's uranium mine and air strip (left of creek).

Uranium Discoveries By Air

Commercial aviation's most difficult flying is performed by rim pilots

By TOM ASHLEY

URANIUM discoveries are now being made by prospectors in lightplanes and the world's greatest air search is under way on the Colorado Plateau. It covers 110,000 square miles of lunar-like terrain embracing parts of New Mexico, Arizona, Utah and Colorado and the search is spreading into adjacent Wyoming and South Dakota.

Thus uranium exploration becomes a part of commercial aviation and aviation a vital cog in history's biggest mineral hunt. We visited the Plateau last month to witness the operation, talking with geologists, pilots and mine owners and flying into many of the nooks and crannies where lightplanes are probing for the precious super ore.

"Lightplanes have become as much a part of the uranium industry as the prosaic Jeep, pickup truck or bulldozer," we were told by the Atomic Energy Commission. Its spokesman was Ernest Gordon, chief of exploration with headquarters at Grand Junction, Colorado. "These little airplanes are our best means of rapid exploration of relatively inaccessible areas."

Lightplanes' Contribution to AEC

Gordon said U. S. exploration for uranium in such areas has been advanced 500 to 1,500 per cent by lightplanes in the last two years — without them, the same man hours would accomplish only one-fifth to one-fifteenth as much exploration. But with them the U. S. has succeeded not only in uncovering significant new ore bodies but has surpassed Canada in uranium production and is striving urgently to reduce its dependence on overseas uranium sources such as the Belgian Congo.

Bonanza view of air strip in Colorado River canyon at Hite, Utah, snapped just after we rounded bend on final. Photo at top left of page by Vic Goodwin of Cortez, all others by the author.

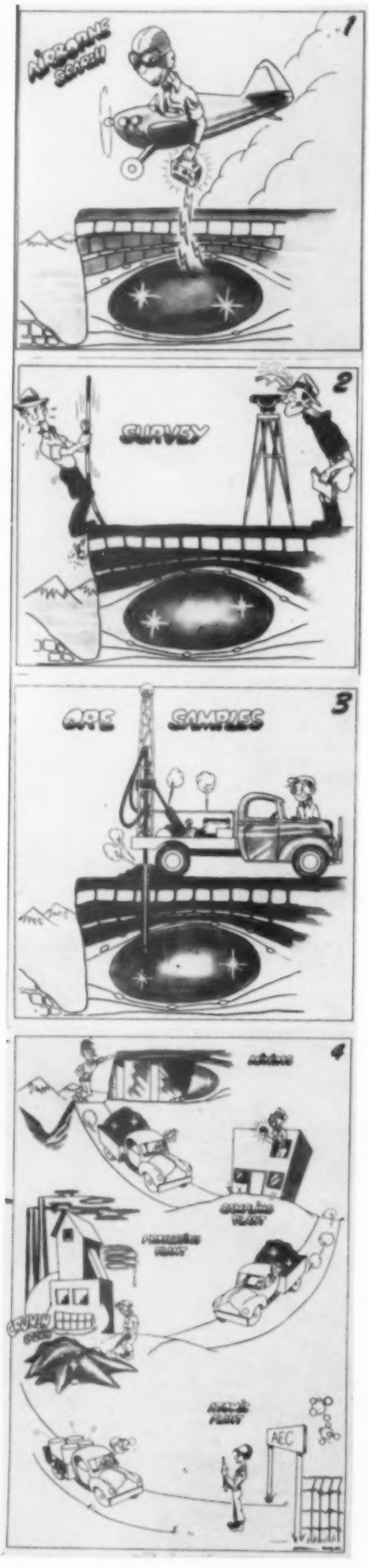
This small strip is used for access to Calamity Mesa near Gateway. Large photo shows Green River northwest of Moab, Utah, with small strip on opposite bank serving La Sal mine and Atomic Energy Commission field camp. Tri-Pacer landed over our Bonanza on canyon air strip (right).

There are at least 185 lightplanes engaged in uranium activities on the Plateau. They operate mostly out of small improvised air strips, of which there are 125. We gathered this from airport operators and from the Civil Aeronautics Administration agent in charge of the Grand Junction district, hard-working and widely-liked John Zentner. Most of these planes are flying prospectors. They carry scintillation counters, which are more sensitive in detecting radioactivity than Geiger counters. Some of the planes do workaday chores such as supplying core-drilling crews and mines with equipment, personnel, fuel, food and other cargos. Only a few highways exist and planes cover distances in minutes which would require hours of surface travel.

By far the greatest number of prospecting planes are operated by individuals and mining companies — only

We spotted famous Happy Jack mine in White Canyon, Utah (below), and terraced diggings at Kerr-McGee Industries on Navajo mountainside (right).

9 are operated by the airborne section of the Atomic Energy Commission, which uses a 10th for general flying and charters others from local operators. The most widely used prospecting plane is the 2-place Piper Super Cub, but there are also plenty of 4-place Cessna Model 180's and Model 170's on the hunt, followed by a variety of other types including Beech Bonanzas, Callairs, Mooney Mites and Taylorcrafts. Multi-engine transports are ferrying executives in and out of the area, using the larger strips and airports.



Cartoons explain Colorado Plateau uranium activities. Flying the rim, lightplane at top locates an "anomaly" when scintillator registers radioactivity. Ground crews are then flown to mesa for survey followed by bulldozers which make way for truck carrying core drill. Mining sends ore to processing mill in trucks via a sampling and purchasing station. Mill reduces ore to uranium concentrate which is yellowish powder. It is shipped in steel drums to atomic energy plants. Cartoons furnished by Richard O. Dulaney, Jr., uranium operator at Grand Junction, Colorado.

How It's Done

Where the Super Cub and Cessna 180 reign supreme is the out-country, where we went to see the conditions under which they operate. The lowest river bed is 5,000 ft. or more above sea level and the rims and mesa tops along which practically all air prospecting is done range up to 9,000 ft. and more in elevation. Thin air effect in reducing engine power and wing lift is greatly aggravated by broiling heat from the sun and 95 to 100-degree air temperatures are common. Making all this even worse is air turbulence and burbling caused by winds chopped up by jagged terrain and thermals.

There is no escape from these conditions for pilots because they must "fly the rims" before the geologists they carry can pick up any radioactivity at all from the thin and scattered deposits of uranium which characterize the Plateau. Flat terrain is unyielding to an airborne scintillation device because only 1 to 2 feet of rock overburden is sufficient to shield radiation from ore bodies. But millions of years of erosion and earthquakes have exposed many ore-carrying formations along the walls of mesas and canyons and uplifts where geological formations outcrop. These easily-identified strata are what the pilot and his geologist hunt for. To measure their radioactivity, they must be flown at extremely close range—with the rock 50 ft. or less from the airplane as it wings its way slowly alongside the formation.

A meter on the scintillation device registers radioactivity. Any substantial "kick" of the needle brings the pilot back for a retake and continuous good readings mean that an "anomaly" has been located. A ground crew then takes over for ore sampling and core-drilling to block out the extent of the uranium ore body and justify mining operations.

It's the most difficult flying in commercial aviation but it is paying off with hundreds of anomalies, thousands of claims being staked and scores of mining operations.

Our flying visit to the Plateau was with Clark Carr, who barnstormed the Western Slope in the late 1920's and who spends his spare time flying around the Plateau. We have written articles in years past on Carco Air Service, the interesting little airline which he operates with Beech Bonanzas and Twin-Bonanzas for the Atomic Energy Commission between Albuquerque and Los Alamos, the AEC Weapon Center. Several years ago he began describing the scenic wonders of the Plateau to us. When lightplanes began making actual uranium discoveries, he became urgent and we got out to Albuquerque for a trip with him into the uranium country.

Exploring the Plateau

With cans of spare gas, Carr's Bonanza took us over most of the known anomalies and mines in the 110,000-sq. mi. area. We began at Grants, New Mexico, where Anaconda Copper Mining Company operates the first uranium mine to be discovered by air. Jack Knable, Anaconda manager, is also a pilot and in his Piper Cruiser found the anomaly which is the famous Jackpile Mine, one of the nation's richest uranium deposits.

Northwest we went to visit the mountainside uranium diggings of Kerr-McGee Oil Industries on a series of Navajo Indian leases acquired from a couple of Texans well known in private flying circles. One is Richard O. Dulaney, Jr., who used to fly a Texaco Spartan among other things, and the other is G. R. (Buffalo) Kennedy, erstwhile operator of interests in Mexico, including a fishing camp for airmen at La Pesca, where the big Soto la Marina empties into the Gulf of Mexico below Brownsville.

A few miles to the northwest we circled the historic Monument No. 2, first uranium mine in the Plateau. We were in Monument Valley and landed at Harry and Mike Goulding's Indian Trading Post strip nestled beneath the towering and colorful buttes. Flying north after a brief visit with the Gouldings, we picked up the Colorado

(Continued on page 36)

Bonanza carrying Clark Carr and Bailey Henderson of Albuquerque is met by Harry Goulding in Jeep at his Mounment Valley air strip amid towering buttes (right) among which visiting planes let down for a landing.
—(FLIGHT MAGAZINE Photos.)

Airmen Welcome

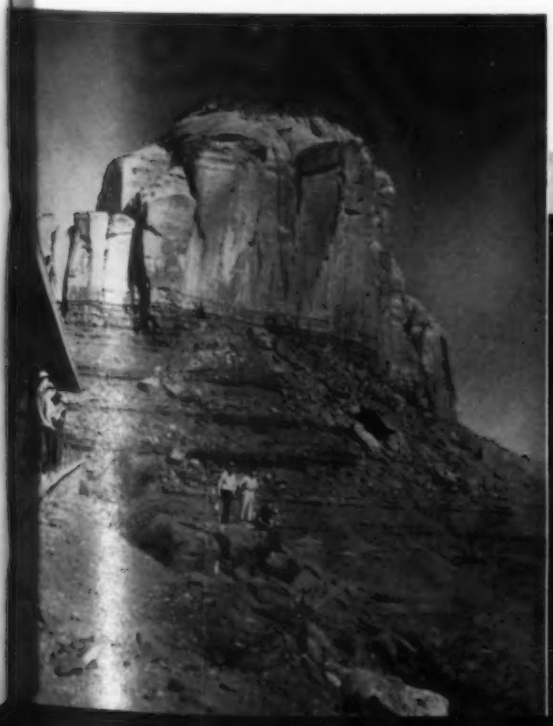
OF many interesting places for airmen to visit which FLIGHT MAGAZINE editors have tried, the most colorful of all is Monument Valley Trading Post and Lodge — its 3,000-ft. desert air strip, from which Beech D18 Twins and Douglas DC-3's have operated, is surrounded by brilliantly-colored spires and mesas.

The location is in Utah right on the Arizona line some 65 miles west of the meeting point of four state boundaries, those of Utah, Colorado, New Mexico and Arizona.

Harry Goulding and his wife, Mike, have operated a Navajo trading post here for three decades. They also have guest lodgings, including eight new suites fully air-conditioned and luxuriously comfortable. These are part way up a huge butte, beneath a tremendous rock overhang. Their picture windows overlook the air strip and 100 miles of colorful scenery. Rates are $9 to $14 per day, including meals. If you don't see anybody, land anyway for Harry or Mike will drive down from the trading post in a Jeep to meet you. Two or three planes a day visit them.

★ ★ ★

Monument Valley guest lodge (left) is part way up a butte overlooking air strip (below). View from lodge (right) shows Goulding (wearing hat) and Carr and Henderson silhouetted against desert vista. Uphill air strip is 3,000 ft. long at 5,230-ft. elevation.



These three Cessna 170's have flown over 1,000,000 miles since early 1951 in patrolling the Transcontinental Gas Pipe Line Company's right-of-way from Mercedes, Texas, on the Mexican border to New York City. They average 700 to 800 hrs. of flying annually per plane.

Pipe Line Air Patrol

Low-flying pilots are right-of-way guardians on Texas-New York patrol

THE world's largest single-project gas pipe line starts at Mercedes, Texas, and snakes across 12 states to downtown New York's Manhattan Island. Every inch of it is alive, pulsing with the daily movement of 555,000,000 cu. ft. of natural gas compressed to 750 lbs. per sq. in. That's a lot of product handling and it requires unending watchfulness and maintenance by engineers and crews stationed all along its course — plus an air patrol flown by watchful pilots.

This, which is the line of the Transcontinental Gas Pipe Line Corporation of Houston, Texas, is one of many petroleum industry pipe lines which operate air patrols. The industry long ago selected lightplanes as the best means of patrolling its long lines and scores of airplanes are in the air every day flying pipe lines all over the United States.

The patrol planes of Transcontinental Gas are Cessna 170's. Whereas many firms use 2-place patrol ships, Transcontinental selected the 4-place 170 because it is used for general transportation and hauling as well as for patrol.

Three Cessna 170's are operated by the firm. One is based at Houston and patrols the southern one-third of the pipe line. A second based in Atlanta, Georgia, patrols the center third of the line. No. 3 is based at Culpepper, Virginia, and patrols the northern third of the system.

Each of the Cessnas flies its section at least twice each week. But it is logging time attending to other chores when not flying the line. These duties include the transportation of line foremen or superintendents, who are flown over their respective territories once or twice a week. Or the patrol pilot may be called upon to rush men and materials to an emergency project. They stay busy, averaging 700 to 800 hours or so per year in the air.

Transcontinental pilots fly patrol at an altitude of about 300 feet off the ground, frequently going lower for closer inspection when the need arises. They are really aerial guardians of vast expanses of countryside, not all of which is the right-of-way. In addition to their vigil over the pipe line, they keep an eye on adjacent farms, for example, and have proved of valuable help in reporting such things as rising floodwaters, accidents, fires and other emergencies.

Accurate mileage meter in pipe line Cessna operates off tachometer but is adjustable by pilot according to ground speed made good. It furnishes readings between mileage markers on pipe line to pin-point trouble spots accurately.

On the line, the thing they look for most is a cave-in of fill dirt, for this is the surest sign of trouble in the making. It calls for prompt inspection and maintenance. Let a work crew approach the line with dragline or bulldozer or ditch-digging operations and a radio report is made. These can bite into the big pipe line unless caution is taken. In addition to the necessity of keeping the line flowing uninterruptedly with its heavy volume of natural gas to some 75 cities along the route, Transcontinental is obligated to property owners to keep its right-of-way in tip-top shape, too. It all adds up to a constant surveillance against deterioration and malfunction.

A private micro-wave communications system is operated alongside the pipe line, with pumping stations and offices feeding a constant flow of messages throughout its length. This has mainly to do with handling of the gas and its flow. But it is also linked in with the patrol planes via their two-

Cable suspension crossing over Atchafalaya River near Melville, Louisiana, is world's longest pipe line suspension bridge. It is 4,678 ft. long. Transcontinental's pipe line crosses beneath 76 rivers and over four.

way radio. Mileage markers dot the right-of-way so that pilots will have accurate references in case of emergency reports. However, these still offer only a general idea of location when trouble needs reporting. So one of the patrol pilots, Yates Stafford of Culpepper, Virginia, found a more accurate way of measurement. He devised a mileage meter which actually ticks off the miles of right-of-way his airplane covers. Many airplane pilots have always dreamed of having this — a simple little gadget which is not dependent on radio or ground transmitters such as distance measuring equipment (DME). Stafford's device operates off his engine tachometer and is adjustable to actual ground speed as determined by the pilot. He has found it highly accurate in pin-pointing fallen trees, wash-outs and other troubles.

Transcontinental is one of the industry's newest major pipe line companies, flowing its first natural gas through the line in 1951. However, its three patrol planes have already covered more than 1,000,000 miles of flying — all without an accident for a perfect safety record despite the fact that much of its flying is along pipe lines in forests, swamps and other terrain where a landing would be difficult. There has been but one forced landing. It became necessary when a settlement bowl on the fuel line broke. That landing was uneventful and no damage was incurred.

"Cessna flat built an airplane when they came out with the Model 170," says George Cendrick, Jr., aviation department superintendent. One 170 is a 1949 model and the other two are 1950 models. Tom Wheat, corporate secretary, says the Cessnas are being operated cheaper per passenger mile than the company's automobiles.

An example of this operation is furnished by the line's 1949 Cessna 170, which is N9519-A. During the last 12 months, it logged 858 hrs. and 10 mins. in the air. This covered a total of 93,476 miles. It used 6,700.1 gals. of gas. While burning an average of 7.8 gals. of fuel hourly, it consumed only .16 of a quart per hour. Very meticulous operating records are maintained for each airplane. Engines are replaced by new ones once a year at the time of the annual inspection for each plane. This includes a complete teardown of the airplane and replacement of all moving parts. Spare engines are kept ready to go as complete power packages, replete with propeller and accessories. In case a change is needed, it takes only 2 hours to remove the old engine and replace it with a brand new one.

Aviation has played a prominent role in its activities since construction first started on the big pipe line, long before it began operations. Aerial mapping was used in routing it across the nation. Lightplanes were used by construction companies which built it. Not only do airplanes patrol it, but Transcontinental uses other planes, too. These include a Lockheed PV-1 Ventura fast transport, a Beech D18 Twin and a Beech Bonanza.

Transcontinental is a huge enterprise. It buys natural gas from 70 gas fields in Texas and Louisiana. It pumps this at a rate of 200 billion cu. ft. annually across the country to retail gas companies which sell it in 75 towns and cities. Total steel pipe line operated is 2,330 miles. Of this, 1,564 miles are "big inch" in dimensions, being 30 ins. in diameter. The main line, 1,832 miles long, passes through 12 states, 109 counties and under 110 railroads and 619 highways. It crosses beneath 76 rivers and above four others on aerial suspension crossings, of which the one over the Atchafalaya River in Louisiana is the world's longest. Nineteen compressor stations push natural gas through the line, utilizing 259,200 horsepower for the task. ★ ★ ★

Patrol Pilot Yates Stafford fills out his report at the end of a day's flying, while his son looks on. He's based at Culpepper, Va.

Completely-equipped 145-hp. Continental power plants are maintained in readiness for patrol planes. Engine change takes only 2 hrs.

Aerial view of nation's biggest integrated aircraft manufacturing plant in Marietta, Georgia.

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In Marietta, Georgia, the nation's biggest integrated aircraft plant has never missed a delivery schedule.

Government Plant No. 6, operated by Lockheed Aircraft Corporation.

B-47 Multi-Jet Bombers on Marietta flight line before joining U.S. Air Force.

The minute you step inside Lockheed's Marietta, Georgia, factory, you are impressed with the overwhelming size—seemingly endless production lines integrating every conceivable facility for making all types of aircraft. This plant is particularly suited for the largest airplanes—bombers, tankers and transports.

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This bigness saves *you* money because it means more efficient, more economical aircraft production. It provides maximum flexibility in production planning. Consequently, with minimum effort, the Marietta factory can be arranged to handle any design or any type of aircraft, guaranteeing a continuous flow of material from the raw state to the completed airplane. Today, more than 45,000 different parts are being manufactured at Marietta.

That's why the U.S. Air Force selected the Marietta factory to build multi-engined B-47 Jet Bombers and C-130 Turbo-Prop Combat Cargo Planes. In the more than three years under Lockheed management, this Marietta plant has never missed a delivery schedule. And today, new cost and performance records are winning additional commendations from the USAF.

Look to

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Fletcher Utility grosses 3,478 lbs., with 1,909-lb. empty weight including 27-cu. ft. hopper which carries 1,250-lb. fertilizer load. Nose wheel simplifies operation for pilots working long hours in short hops. —(Fletcher Photo.)

New Fletcher Crop Plane

FLETCHER Aviation Corporation at Rosemead, California, has perfected a new low-wing, tricycle agricultural airplane with a 225-hp. Continental engine and a 1,250-lb. payload. First sale has been made to a New Zealand firm which ordered 100 airplanes, these to be used in the aerial application of superphosphate fertilizer over grasslands — "top dressing" — for the increased production of sheep.

Called the "Utility" model by Fletcher, the new work plane utilizes a hopper which will hold a cubic yard (27 cu. ft.) of chemical fertilizer. The craft was designed to take-off with a 1,250-lb. load of fertilizer within 870 ft. from unimproved flight strips.

The Cable-Price Corp., Auckland, N. Z., ordered 100 planes, and will get the prototype, which was first flown in July, 11 fully-assembled aircraft and 89 complete "kits" to be assembled in New Zealand. The kits are being fabricated by Fletcher by "matched hole tooling" which eliminates the need for costly jigs in final assembly. No price was mentioned in Fletcher announcements.

While the Utility's big hopper is carried behind the pilot, Fletcher says it is equipped with a 40G "safety section" around the pilot. It has withstood static compression loads in excess of 66,000 lbs., said to be equal to flying the fully-loaded aircraft into the ground at a 45-degree angle at 70 mph. Other features include plastic painting and coatings as protection against chemicals.

Fletcher figures for the airplane include 1,909-lb. empty weight, 3,478-lb. gross weight, 3.8 limit load factor at gross weight, 42-ft. span, 31 ft. 10-in. length, 9-ft. 4 in. height, 7-ft. wing chord, NACA 4415 wing section, 294-sq. ft. wing area, 42-mph. minimum speed at gross, 750-fpm. rate of climb, 15,700-ft. ceiling, 108-mph. cruise speed and 40-gal. fuel capacity for 370-mile range. ★ ★ ★

Flight pictures show new all-metal crop plane distributing chemicals in manner similar to that of applying top dressing of fertilizer to New Zealand grassland. —(Fletcher Photos.)

This Heron Series 2 executive transport was recently delivered by de Havilland to Canadian Comstock Co., Ontario, Canada, for business use. Four 6-cylinder engines are rated at 250 hp. each. —(de Havilland Photo.)

Executive Heron

A NEW executive version of the 4-engine de Havilland Heron with retractable landing gear is being offered in the United States by Butler Aviation, which operates sales offices at Dallas, Washington and New York. Price of the executive version is $186,550, fully-equipped except radio, according to Ira Hartzog, Dallas sales manager for Butler.

The Heron is powered by four de Havilland Gypsy Queen 30 engines, each rated at 250 hp. Unlike the more powerful engines in the de Havilland Dove, some 70 of which are operating in the U. S., these engines are not supercharged and have dual carburetors instead of the Dove's fuel-metering units. They drive 2-bladed, all-metal, constant-speed de Havilland propellers.

Performance of the executive Heron, which has 8 cabin seats as compared with 17 passenger seats in the airline version, includes 183-mph. cruising speed. U. S. versions will have 500-gal. fuel capacity, according to Hartzog. This is sufficient for a maximum range exceeding 1,500 miles. ★ ★ ★

Executive Heron cabin has 8 passenger seats in roomy cabin, with folding table between each pair. Extra flap can be raised to join each pair of tables. Airline version of Heron seats 17 passengers. —(de Havilland Photo.)

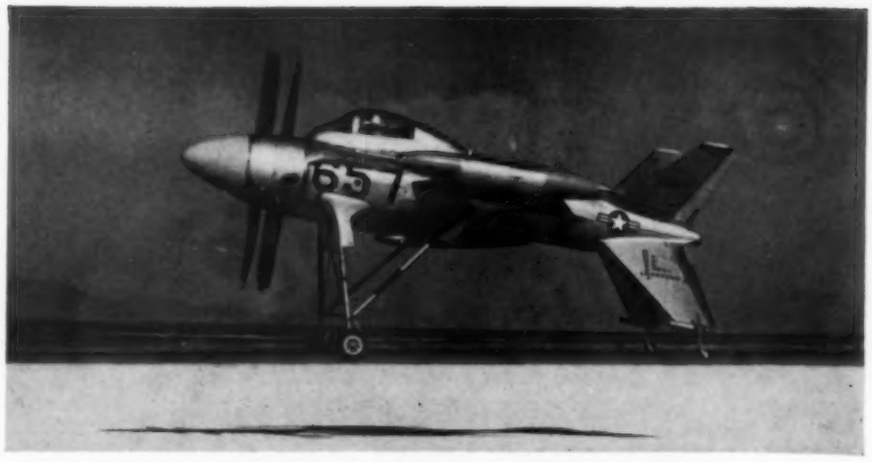
AIR REPORT

(Continued from page 8)

Super trues out at 215 mph. pulling 27 ins. of manifold pressure at 2,000 rpm. Eleven-month production of the single-engine Bonanza is estimated to be 300 units, or a 15 per cent increase over 1953 Bonanza sales.

MOST COMPLETE DEGREE OF OPERATING FLEXIBILITY yet granted a local service airline has gone to Lake Central Airlines in a CAB authorization of non-stop schedules between five pairs of cities and no-revenue overflight between certain other cities.

COMPACT NEW AIRBORNE RADAR for military transports has been perfected by Sperry Gyroscope and the Air Force Research and Development Command. Weighing only 150 lbs., it has a gyro-stabilized antenna only 18 ins. in size and its 5-in. screen offers fixed ranges of 50, 100 and 240 miles with close-up enlargements variable from 3 to 30 miles. Called the APN-59, it operates in the X band for many radar functions including search and surveillance, navigation, storm detection, and anti-collision warning of terrain obstacles and nearby aircraft in flight. Areas shown may be oriented to aircraft heading or optionally to true north or any desired bearing for drift measurement.



FIRST FLIGHTS OF LOCKHEED XFV-1 VERTICAL TAKE-OFF FIGHTER have been made with conventional landing gear for horizontal flight, with vertical take-offs and landings to follow. However, Test Pilot Fish Salmon zooms the VTO into a very sharp climb after a take-off run of less than a city block. Vertical take-offs await arrival of an Allison turbo-prop engine designed to work as well vertically as horizontally, Lockheed explained. But Fish says he has already hovered it nearly motionless. "Whirling its props and wagging its tail, this airplane swims right upstream," the crack test pilot commented. "With the proper engine, I can hang it on a cloud — it will sit still in the sky, back straight down or move straight up." —(Lockheed Photo.)

FIRST FREE VERTICAL TAKE-OFF by a U. S. VTO fighter design has been made by the Navy's Convair XFY-1 piloted by Test Pilot Skeets Coleman. He lifted it 20 ft. off the ground on Aug. 1. Later, he lifted it 150 ft. off the ground before backing down for a landing. "It's more maneuverable and responds faster than any plane I've flown," he said after the brief operations. —(Convair Photo.)

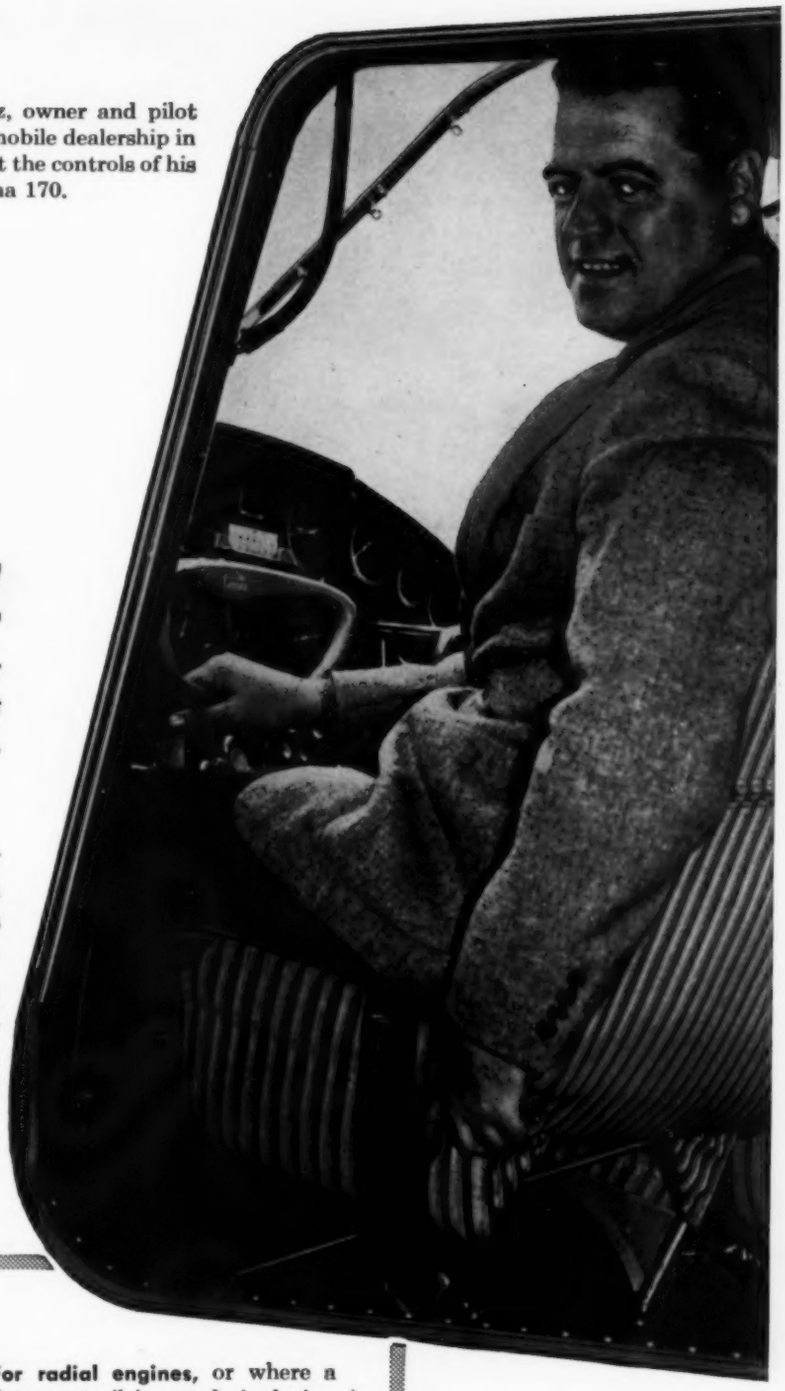
BENDIX RDR-1 AIRBORNE RADAR demonstrations for executive pilots are being made in the Bendix DC-3 flying show-room demonstrator. FLIGHT MAGAZINE editors went on one of the flights during which the RDR-1's screen plainly mapped thunderstorm cells, both in location and in degree of intensity. It uses the X band. Total weight of the installation is about 150 lbs. Commercial deliveries begin this fall. Dallas area demonstrations were conducted by Bendix through its distributor, Dallas Avionics, headed by Bill Price.

SIXTH ANNUAL ALL-TEXAS AIR TOUR will start at Temple on Oct. 9 and include RON stops at Galveston, Shreveport, Mineral Wells, Plainview, Carlsbad, Brownwood, Laredo and Brownsville, with a three-day side tour of Mexico available Oct. 17-19. This is the largest air tour in the U. S., and is sponsored by the Texas State Aviation Association, Texas Private Fliers Association, Texas Flying Farmers, Texas Ninety-Nines, Texas Civil Air Patrol and Texas Aeronautics Commission. Inquiries should go to Texas Air Tours, Walton Building, Austin, Texas. Everybody's invited. The Tour slogan is "It could be longer, but we'd always be on the run; it could be bigger, but not nearly as much fun."

NEWEST CLAIM FOR WORLD'S ALTITUDE RECORD is about 90,000 ft., reached recently by the Bell X-1A research rocket plane and piloted by Major Arthur Murray, assistant chief of flight test, Edwards Air Force Base, California. The Air Force did not specify the flight's exact altitude but said it exceeded the 83,235 ft. reached

1,000th LANDING AT HELIPORT operated by Western Hills Hotel in Fort Worth, Texas, was by a Bell Model 47G piloted by Bell Pilot Jim Carmichael and carrying Mr. and Mrs. Darrell White. White is president of Associated Airmotive in San Antonio. His wife is a native of Greece, whom he met and married at the end of World War II while operating an international non-sked airline between Europe and the Orient. He is a former Air Force colonel. —(Bell Photo.)

Harold K. Kurtz, owner and pilot for his own automobile dealership in Kutztown, Pa., at the controls of his Company's Cessna 170.



Ask the men with the most experience . . . ask

HAROLD K. KURTZ

Owner and pilot for
Harold K. Kurtz Chevrolet
Kutztown, Pa.

No sensible aircraft pilot takes unnecessary chances, and that applies to choosing petroleum products, too. It's natural to pick out the brands that year-in, year-out deliver the best service.

"21 years of flying and more than 4,500 flight hours have taught me that Gulf delivers the goods. In flying all over eastern United States, I've used Gulf Aviation Products exclusively for the last 8 years."

For safer flying,

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It's "refinery-clean" for your safety because Gulf Aviation Gasoline dispensing units are equipped with advanced Micronic Filters.

For radial engines, or where a detergent oil is not desired. Approved by Pratt and Whitney and other radial engine manufacturers for all types of service. Retards sludge and carbon formation and retains its body at high operating temperatures.

For horizontally opposed and Ranger in-line engines. Minimizes ring and valve sticking, oil consumption, oil-screen clogging and plug fouling. Users of this great detergent oil have actually increased periods between engine overhauls by as much as 100%.

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Always Ready To Go

Hundreds of Cessna owners all over the country depend on the Authorized Cessna Service Stations listed below for their transportation needs—Authorized Cessna Service is their assurance that business planes are always ready to go, always in top condition for reliability, performance and comfort.

Every Cessna owner is guaranteed three important things by our factory-supervised Cessna Flat Rate Service:
(1) You get an accurately quoted price and time-required quotation based on hundreds of job studies covering virtually all maintenance needs.
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To make the most of your Cessna's usefulness, visit the Authorized Cessna Service Stations listed below.

These progressive Cessna Authorized Service Shops offer flat-rate service.

Aircraft Sales Company
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Cruse Aviation, Inc.
Municipal Airport
Houston, Texas

Dal-Tex Aviation, Inc.
Highland Park Airport and Love Field
Dallas, Texas

Hair Flying Service
Harding Field
Baton Rouge, Louisiana

Howard Aero Service, Inc.
San Antonio International Airport
San Antonio, Texas

Ragsdale Flying Service
Municipal Airport
Austin, Texas

Southwestern Skyways, Inc.
New Municipal Airport
Santa Fe, New Mexico

Kenneth Starnes Aviation Service
Adams Field; Little Rock, Arkansas

Yingling Aircraft, Inc.
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Wichita, Kansas

Top Performer . . . Cessna 180 Businessliner

It's '54's "Smoothest" Airplane

America's most widely acclaimed new airplane—the powerful Cessna 180—now offers you greater performance, beauty and value than ever in a brilliant 1954 model! Completely service-proved—refined and improved in dozens of ways, it's quieter and smoother, cruises over 150 m.p.h., offers full 4-place comfort, brilliant new interior and exterior colors and styling and yet the Cessna 180 is still $6000 *under* the nearest competitor. Only $12,950!

Cessna 180 AIRCRAFT COMPANY

"Living Room" Comfort Aloft

Step in! Stretch out! Here you'll find more foot and leg room, more over-all comfort than in any other airplane in the 180 class. A powerful heating-ventilating system keeps you comfortable in every season, at every altitude.

Smoothest Power Possible

. . . So smooth that when the engine is running, you can even rest a glass of water on the cowling without disturbing the water! . . . flashing 6-cylinder power with automobile economy. Eight brand-new engine improvements.

No Other Airplane Can Match Cessna 180's All-Round Performance!

New Exterior Baggage Door . . . New Color Striping . . . New Upholstery . . . New Sloping Map Compartment . . . "Para-Lift" Flaps . . . World's Safest, Smoothest Landing Gear . . . Extra Sound-Proofing . . . Gravity-Feed Fuel System (60 gals.) . . . Easy conversion for skis, floats or cargo. For more information, see nearest Cessna dealer (listed in yellow pages of your telephone book) or write Cessna Aircraft Co., Dept. FM-10, Wichita, Kans.

FIRST FLIGHT OF LOCKHEED YC-130 TURBO-PROP AIR FORCE TRANSPORT was made on August 23 and demonstrated its ability to take off in one-third the usual distance required by large transports. It is powered by four Allison T-56 engines driving Curtiss-Wright Turbolectric propellers and was designed to fly higher and faster than any current military transport.

—(Lockheed Photo.)

4-Place Bell

A new 4-place version of Bell Aircraft Corporation's popular Model 47 helicopter is being demonstrated on a tour to determine customer reaction before going into production. The Model 47G-1 offers cabin convertibility for passenger cargo, full cargo litter and hoist operations. It is powered by a down-rated Lycoming O-435 engine which normally delivers 260 hp. It also features a more streamlined cabin and monocoque tail boom. Bell also plans to offer a Lycoming installation kit for Model 47's already in the field. Top photo shows the new version in flight with conventional models. Lower photo shows seating arrangement.

—(Bell Photos.)

a year ago by the Douglas D-558-2. The X-1A is also the world's fastest airplane, having been flown at 1,650 mph. by Major Charles Yeager.

MAJOR FACILITIES OPERATED BY CAA in the U. S., Alaska and Hawaii, as of June 30, 1954, and on the same date a year ago are listed as including the following:

	June 30, 1954	June 30, 1953
Controlled colored airways, miles	70,713	72,324
VOR airways, direct, miles	62,028	52,512
VOR airways, alternate	22,274	20,737
Intermediate fields	78	82
Jointly-operated fields	43	43
Airways beacons (excluding landing areas)	862	892
Neon approach lanes	74	78
HI approach light lanes	37	35
Airport surveillance radar	27	11
Fan markers	269	286
Distance measuring equipment	167	16
High power non-directional radio beacons	5	5
Instrument landing systems	147	123
Low-medium frequency ranges	352	372
Low-med. pow. non-directional radio beacons	173	169
Precision approach radar	10	10
VHF omni ranges	383	375
VHF visual-aural ranges	11	17
INSACS (interstate airways communications station)	384	411
OFACS (overseas foreign airways comm. sta.)	12	15
Air route traffic control centers	31	31
Airport traffic control towers	113	122
Combined station-towers	61	41

SLOW FLIGHT AT LESS THAN 11 MPH. has been demonstrated at Oxnard, California, by Willard R. Custer's CCW-5 twin-engine channel-wing prototype business plane, he announced last month. He said his test pilot, Walter J. Davidson, slowed the CCW-5 from 180 mph. to 11 mph. "I couldn't believe my eyes so I looked over the side and saw I was practically standing still," Davidson said. "When I saw people waving their arms at me, I knew we had something great." No details were given. Custer intends to license others to build the design rather than produce it himself, he said.

PRODUCTION AND FACILITIES CONTRACTS FOR J69 jet engines, to be used in the Cessna twin-jet T-37 trainer and in the Ryan Firebee target drone, have been awarded Continental Aviation & Engineering Corp., in Detroit, according to C. J. (Jack) Reese, president. The multi-million-dollar orders will launch sizeable production of the J69... **CESSNA HAS $5,000,000 ORDER** for T-37 twin-jet trainers. First flight of prototype is due soon.

ENTRY OF BEECH AIRCRAFT INTO GUIDED MISSILE AND TARGET DRONE FIELD has been signalled by organization of a new engineering division headed by Dr. James F. Reagan.

THE AIR FORCE HAS ORDERED A NUMBER OF JET TANKER-TRANSPORTS from Boeing Airplane Company as a result of Boeing's Model 707 development. Order puts Boeing in position for rapid develop-

ment of a commercial version of the 707.

A NEW LIGHTWEIGHT AUTOMATIC DIRECTION FINDER weighing about 3 lbs. and selling at less than $200 has been announced by Air Associates. For homing on low-frequency beacons, ranges or broadcast stations, it is simple to operate in conjunction with any standard LF aircraft receiver.

AMERICAN AIRLINES resumed operations last month after a 25-day strike by Air Line Pilots Association-AFL over nonstop coast-to-coast DC-7 schedules slightly in excess of 8 hrs. for the same crews. Later, AA reduced flight mileage about 9 per cent and personnel by 7.5 per cent to bring the pattern of service in line with anticipated traffic. Reductions included 122 co-pilots, 38 flight engineers and about 1,240 other employes.

A 4-PLACE TWIN-JET PERSONAL-TYPE PLANE which will cruise 358 mph. and which has a pressurized cabin made its first flight on July 29, 1954, in France. It is the Morane-Saulnier 760, powered by two Turbomeca Marbore II jet engines, each rated at 880 lbs. of thrust. Range with tip tanks is 870 miles. Service ceiling is 36,000 ft. Cruise speed of 358 mph. is at 20,000 ft., where cabin pressure is equivalent to 10,000-ft. ceiling.

NEW MANAGER OF TEMCO AIRCRAFT'S GREENVILLE (Texas) plant is E. Fred Buehring, formerly Temco assistant director of contracts. He succeeds Herrol W. Bellomy, popular Greenville manager, who has begun an extended vacation because of ill health after which he will be reassigned by Temco.

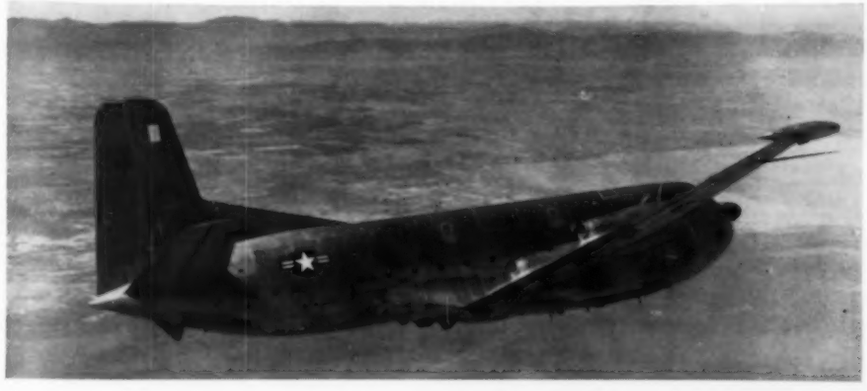
AN AERO COMMANDER RESEARCH AND DEVELOPMENT ENGINEERING DIVISION has been created by Aero Design and Engineering Co., and will be located on Max Westheimer Field at Norman, Okla., near the University of Oklahoma's School of Aeronautical Engineering. Ted R. Smith, vice president of Aero Design, will head the new division and the University will work closely with it. In the photo, left to right, are Smith, Aero Design President Rufe Amis and University President George L. Cross. Amis said his new division will start an aggressive long-range research development program to assure leadership in business planes. It will use University facilities including subsonic and supersonic wind tunnels, a jet lab and a structures lab.
—(Aero Design Photo.)

LEAR MODEL 1500 YAW DAMPER is described in a new illustrated brochure available from Lear, Inc., 3171 S. Bunday Drive, Santa Monica, California.

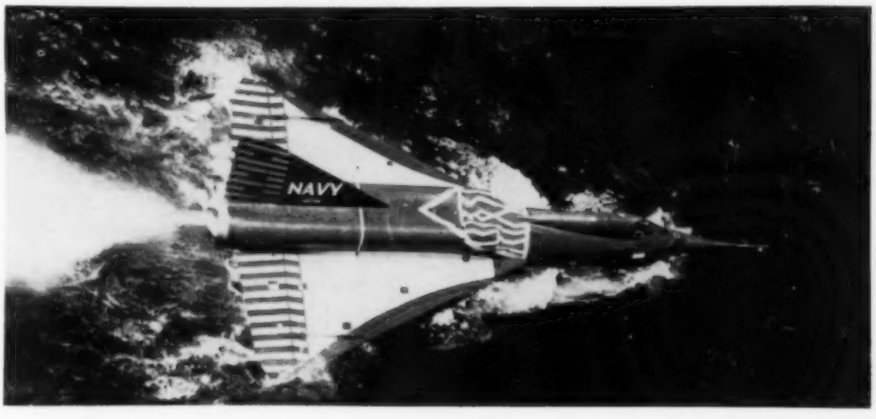
PRATT & WHITNEY ENGINE OPERATION AND MAINTENANCE FORUMS are scheduled on Sept. 15 at Airwork Corp., Millville, N. J., and on Sept. 22 at Southwest Airmotive in Dallas with large attendance by executive aircraft owners, operators and crew members.

PERSONAL NOTES: Col. Emmett B. Cassady, USAF, well kown pilot and oldtimer in Texas and southwestern aviation, is the air attache of the U. S. Embassy at Rome, Italy. . . . Jim L. Wathan is back in the fixed-base operations harness after a two-year respite. New location is Wathan Flying Service, Municipal Airport, Cedar Rapids, Iowa. . . . Sid M. Gamsu, former McCauley propeller executive, has established a consulting engineering service in Dayton, Ohio.

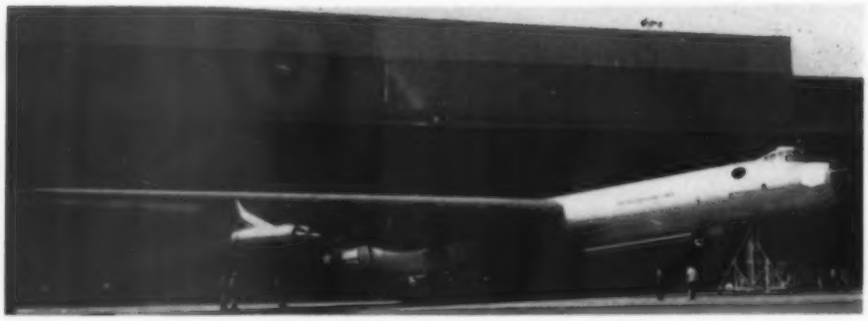
PACIFIC AIRMOTIVE was low bidder recently on an Air Force contract for overhaul of C-47 and C-117 transports and will perform the work at its Chino, California, plant. ★ ★ ★



FIRST FLIGHTS OF TURBO-PROP DOUGLAS YC-124B have demonstrated superior capabilities of turbo-prop power for cargo planes, says Douglas Aircraft. It is powered by four Pratt & Whitney YT-34-P-1 turbines driving Curtiss-Wright propellers and is a flying test-bed for the new C-133A which Douglas will produce for the Air Force.
—(Douglas Photo.)



FIRST ROUGH WATER OPERATIONS IN THE OPEN SEA have been conducted with the Convair XF2Y-1 Sea Dart, an experimental Navy delta-wing interceptor. After its fourth landing on the ocean, it was floated into the stern well of a Navy landing ship dock in a test of open-sea retrieving. It is equipped with hydro skis. Later, the Sea Dart was flown at a speed faster than sound in a dive from 34,000 ft.
—(Convair Photo.)



LAST B-36 TO BE MANUFACTURED BY CONVAIR is shown being rolled from the Fort Worth factory where delivery was made to the Air Force last month, completing its fleet of intercontinental bombers. The plant will continue to overhaul and maintain B-36's, which are operated in combat readiness by the Strategic Air Command.
—(Convair Photo.)

JUST AMONG OURSELVES

(Continued from page 13)

learned from developing the B-36, which put fear in the minds of the Commies to the point they haven't wanted another world war up to now. That idea is if we continue to keep one jump ahead of them as we did with the B-36, maybe they'll never launch that first devastating blow.

OFF THE BEAM

IT ill behooves the American Association of Airport Executives and the Aircoach Transport Association to line up against the proposed legislation for granting permanent certificates to the nation's 14 local service airlines. It is inconceivable that either one of these associations, of all aviation trade groups, should try to kill a piece of legislation that would help them rather than injure them.

Under date of August 6 the Aircoach Transport Association put out a bulletin entitled "Kill the Local Service Airline Bill!" They point out that the CAB, the Post Office and Commerce Department all opposed the bill. Strange bedfellows indeed, for the Aircoach Transport Association! The implication in the non-skeds bulletin is that since they can't win their battles the feeder lines should not get a chance.

While the AA of AE has not come out against the bill, there's a lot of strong antagonism on the issue. This is a most enigmatic situation. AA of AE is made up largely of airport managers from the smaller towns — not the big trunk cities. The struggle for survival of local air service could easily become the struggle for survival of the small-town airport and the airport manager's job as well.

The aircoach people and the airport management people have more to gain from local service airline permanent certification than they have to lose. We humbly suggest they get a copy of the Air Coordinating Committee's report to the President under date of May, 1954, under the title of "Civil Air Policy," read it thoroughly and find in it the manifesto for the end of civil aviation development by the United States government. For them to parrot the basic philosophy in this report is very much like the man who cut off his nose to spite his face.

ONE-FAN FLIGHTS TO EUROPE

WHILE we have been categorically opposed to purely "stunt" flights such as those made during the last couple of years across the Atlantic in single-engine airplanes, the fact remains that the successful completion of two flights in August — by a Cessna 170 and a Beech Bonanza — is a vehement tribute to modern lightplanes, power plants, radio equipment, generators, spark plugs, propellers, instruments and all the other accessories that go into the making of today's reliable civil aircraft.

You could probably train a monkey to fly across the North Atlantic in most any kind of lightplane, so the recent flight doesn't prove much from a pilotage standpoint. It is now a recognized fact that any experienced pilot with ordinary judgment, an instrument rating and the ability to stay awake and alert for the long haul can fly from the Canadian shore to European shores in any well-maintained and equipped modern lightplane.

It is sincerely hoped that all the lightplane pilots who have had or now have a hankering to make the same trip in a single-engine airplane will just forget it on the basis that it proves nothing. Even the newspapers have taken such flights off page one and relegated them to more prosaic news columns back aft. There are better and easier ways to get publicity. Besides it is conceivable that in case one goes down in the drink it could cost a million dollars to make a search.

Single-engine lightplane flights across the North Atlantic certainly foreshadow the day when plane owners can negotiate the trip on a routine basis. Unfortunately that day hasn't yet arrived. Until it does, the rash of stunt flights across the North Atlantic should be stopped ★ ★ ★

URANIUM BY AIR

(Continued from page 22)

River in Utah and landed in Red Canyon to look for Joe Plosser, an old-time pilot from Long Beach, California, who took up air prospecting and reportedly struck it rich in uranium. But Plosser's little cabin was bare and we learned he had gone to Alaska to pan for gold. A short hop away we found White Canyon's air strip with three Cessnas operating from it into the extremely rough country thereabouts. Carr took us east then, around Abajo Peak to the Dolores River beneath towering Uncompahgre in Colorado. There we saw U. S. Vanadium's major-scale uranium operation in the area from which radium was shipped early in the century to Madame Curie in France for her pioneering experiments.

Difficult Gateway, Palisade Mesa, John Brown Mesa, Calamity Mesa and Steamboat Mesa to the north came up next and we counted many new diggings and air strips buried in spectacular surroundings. It was obvious that most uranium activity is developing in the most out-of-the-way places, thanks to the lightplane's ability to go practically anywhere despite the odds.

Rags to Riches at Moab

Moab, Utah, was our next stop. This is where young Charles Steen from Texas dug up the richest uranium ore body yet uncovered in the Plateau. As his diggings produced cash, he looked up and favored many former friends, including schoolmate Dennis (Pete) Byrd of Brownwood, Texas, whom he put to work in the mine until Steen could afford a Cessna 195 for Byrd to fly as his pilot. Later they called in from Texas the man who taught Byrd to fly—barnstorming old Burrell Tibbs. They added more lightplanes to Steen's 195, built a hangar and soon had a full-fledged aviation business humming on the little strip serving Moab. Transient airmen couldn't even buy gas there about a year ago. Now Byrd says 25 planes are based there and 15 transients a day come in. Tibbs recently parted company to strike out on his own and

(Continued on page 40)

A good place to hang your hat...

Now for almost a quarter of a century leading businessmen of the great Southwest have been doing business with the J. D. REED COMPANY. They have hung their hat with us through these many years because they have found that they can always depend on the unvarying quality in materials, products and workmanship at the J. D. REED COMPANY.

If you have not already "hung your hat" with the J. D. REED COMPANY you are missing an opportunity to give your airplane the best that is available in service and maintenance. Next time you are in Houston drop in and let us tell you about the advantages of doing business with the J. D. REED COMPANY.

J.D. REED CO., Inc.
SALES SERVICE
Beechcraft
DISTRIBUTOR
MUNICIPAL AIRPORT
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North, South, East or West . . . you can always place your confidence where you see the sign CERTIFIED BEECHCRAFT SERVICE. Modern facilities, experienced personnel and factory authorized parts offer assurance of service satisfaction. On your next trip visit the outstanding firms listed below.

AIRCRAFTCO, INC.
New Municipal Airport
Wichita, Kansas

AIRCRAFTSMEN, INC.
Will Rogers Field
Oklahoma City, Oklahoma

ALAMO AVIATION, INC.
Municipal Airport
San Antonio, Texas

ANDERSON AIR ACTIVITIES
General Mitchell Field, Milwaukee, Wisc.
Truax Field, Madison, Wisc.

ATLANTIC AVIATON CORP.
Teterboro Airport, (25 minutes from Times Square)
Teterboro, New Jersey
Logan Airport, East Boston, Mass.

BUTLER CO., AVIATION DIVISION
Municipal Airport, Chicago, Ill.

CURREY SANDERS AIRCRAFT CO., INC.
Downtown Municipal Airport, Shreveport, La.

CUTTER-CARR FLYING SERVICE, INC.
West Mesa Airport, Albuquerque, New Mexico

GRAY AIRCRAFT SVC. CO., INC.
D. A. Cody, Service Mgr.
Love Field, Dallas, Texas

HUNTER FLYING SERVICE, INC.
Hunter Field, Cedar Rapids, Iowa

ROD MORE AVIATION SERVICES
Cuddihy Field, P. O. Box 556,
Corpus Christi, Texas

ATLANTIC AVIATION SERVICE
New Castle County Airport, Wilmington, Delaware

ROSCOE TURNER AERONAUTICAL CORP.
Municipal Airport, Indianapolis, Ind.

J. D. REED CO., INC.
Municipal Airport, Houston, Texas

TOPEKA AIRCRAFT SALES & SERVICE
Municipal Airport, Topeka, Kansas

TRADEWIND AIRPORT CORP.
Tradewind Airport, Amarillo, Texas

TULSAIR DISTRIBUTORS, INC.
Hangar 8, Municipal Airport, Tulsa, Oklahoma

WINGS, INCORPORATED
Wings Field, Ambler, Pennsylvania
Philadelphia International Airport, Philadelphia, Pa.

the New *Super 18* Beechcraft

To the thousands of business executives who have intimate knowledge of the outstanding record of service of the world-famous Model 18 Beech "Twin" – *the new SUPER 18 Beechcraft* offers a combination of unquestioned reliability with the most modern improvements which deliver increased performance, greater comfort, and extra walk-around cabin roominess.

NEW Performance—Maximum speed, 234 mph. Cruising speed, 215 mph. Range, 1455 miles. High service ceiling, better rate of climb and single-engine performance. Greater gross weight of 9300 pounds means increased pay load.

NEW Operating Efficiency—Added wing area, wing span; new jet-type exhaust stacks; new landing angle; improved pilot's visibility; *plus* other improvements.

NEW Entrance—Larger cabin door lets down to provide an easy stairway for quicker, safer entrance-exit.

NEW Cabin—A higher ceiling and a greater inside usable length provide greater walk-around cabin roominess. An attractive new accordian-type door between cabin and pilot's compartment allows variety of unimpeded seating arrangements.

NEW Interiors—New chairs styled for increased comfort, *plus* the ultimate of styling of interior features.

NEW Windows—Additional and much larger cabin windows provide an improved view for all passengers.

NEW Rear Compartment includes a new rest room with privacy and spaciousness, a built-in luggage rack.

For full details on *the NEW Super 18 Beechcraft,* see your Beechcraft distributor, or write to Beech Aircraft, Wichita, Kansas. More than a thousand postwar Model 18 "Twins" have helped earn recognition that *Beechcrafts are the Air Fleet of American Business.*

BEECHCRAFTS ARE THE AIR FLEET OF AMERICAN BUSINESS

URANIUM BY AIR

(Continued from page 36)

says he is making good. Thanks to Sunday supplement writers who made capital of Steen's amazing rags-to-riches saga, Moab has boomed. Aviation has boomed with it, thanks to Steen, too, for putting some of his diggings into it.

Heading west, Carr took us in the Bonanza past Dead Horse Point along the Green River for a look at the La Sal mine and then into forbidding San Rafael Swell. Deep in a narrow canyon we found an "impossible" air strip operated by a prospector who left Minneapolis last year with $5,000 after his electrical shop burned down, read up on geology and Geiger counters, and moved into the Plateau to spend practically all of his nest egg before making a worthwhile claim. This was Vernon Pick and his mine rivals the Steen find in uranium richness. There are some who say Pick's was an air discovery. It makes an interesting story, like this:

Pick, down to his last $300, was said to be parching his gullet on the desert near the Swell when he spotted an Atomic Energy Commission Super Cub milling around in the distance as if scintillating a single spot. By hasty triangulation, he is supposed to have hurried over the hot sands to clamber up into the radioactive canyon while the Super Cub roared back to civilization to rush the news of its big find. When the AEC ground party it dispatched reached the spot, it confirmed the air-found anomaly all right but square in the middle of it stood Vernon Pick and his claims. The law says finders are keepers and that's what Pick was. His story admits of no skullduggery. Pick says his claim is miles from the point where the Super Cub scintillated. On foot, his counter began clicking in the wash of a stream which he tracked to its source where the counter really went crazy. That's where he began digging. This all happened June 21, 1954. Some say he's now worth $50,000,000.

At any rate, the AEC says that's what its Super Cubs are supposed to be doing — finding anomalies, which it publishes every month, to encourage wider prospecting and mining. Not only ground prospectors but some wiser ones in planes have been following its Super Cubs along the rims. Nothing can be done if somebody follows the AEC pilots into an anomaly and stakes it there on the spot. We talked with Pick and found he has put some of his diggings into aviation, too. He now has two Super Cubs and a Cessna 195. The 195 he uses for transportation, the Cubs for rim-flying and supplying crews in remote spots. The day before we visited him, a drill rig transmission part had broken. But Pick flew it to Denver for repairs and had it back in action the same day. He even flies ice to his crews, covering in 60 minutes a distance requiring 10 hrs. for a Jeep. Everybody likes Vernon Pick, who was sold on airplanes long before uranium was found in the Plateau. He learned to fly as a private pilot back in Minneapolis in 1937.

Finding our way out via Muddy Creek and the Dirty Devil, we had a look at the confluence of the Green and Colorado Rivers as a parting reminder of just how rough this country is when you're down in it. We had criss-crossed the Plateau with Clark Carr in his Bonanza to see most of its 500 or so uranium mines and its 125 or so air strips. Most of these had sprung out of the wilderness since last year, with 3,000 prospectors combing the big country like ants. Cross-country pilots and airplane passengers traversing the area at cruising altitude see nothing of the mesa miracles which men and machines have wrought here, for the vastness of the Plateau swallows up even the airplanes which are working it over like bees.

Rim Flying

The little planes which are making the big discoveries are out before daybreak to reach the canyon rims. They have to start early for it takes but a little of the hot sun to warm over the rocks and generate the thermals which boil the canyon air and make precision flying impossible after 8 or 9 a. m. In winter it takes longer, but wind above 10 or 15 mph. halts rim flying.

Their wingtips held a few feet from the rock, exploration pilots have developed a high degree of skill and a healthy respect for the difficulties, so much so that no serious accidents have marred their record. Tom Boyle, chief of the AEC's airborne section, says he replaces Super Cub engines with brand-new ones instead of overhauling. This comes after about 700 hrs. of flying. By ordinary standards the engines are still good, but this isn't ordinary flying and the change has psychological value, too. Commercial rim pilots pay tribute to the excellent maintenance their planes receive and the most valuable man in the Plateau to them is the A. & E. mechanic at Grand Junction's airport. He is Dan Wegner at Riggs Aviation, which operates maintenance in the Monarch Aviation hangar. All agree that Wegner has no peer — he's one of the few remaining old-time mechanics who puts pride in workmanship before a fast buck or a short day.

Airborne uranium discoveries began as the result of AEC experiments with scintillation equipment in lightplanes. The first such hop was made by Al Tavelli of the AEC in Grand Junction. An Air Force C-47 and a Bell helicopter had worked airborne equipment earlier but the C-47 could not operate low enough to the rocks and the copter was used for gridding instead of finding anomalies. Tavelli, who learned to fly as a private pilot after serving as an Air Force meteorologist in World War II, had his own

SCINTILLOMETER carried in lightplanes on uranium exploration is shown here with Clyde Davis (left) and Dave Johnston of Monarch Aviation and John Zentner of CAA at Walker Airport, Grand Junction, Colorado.
—(FLIGHT MAGAZINE Photo.)

URANIUM OPERATOR Richard O. Dulaney, Jr., is shown at left with his office manager, Edward H. (Doc) Booth, and their Cessna 180 at Grand Junction. Dulaney is from Fort Worth and Booth is from Dallas. A West Pointer and Army-trained pilot, Booth organized the fixed-base operation at Love Field in Dallas which became Southwest Airmotive, one of the nation's largest.
—(FLIGHT MAGAZINE Photo.)

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Piper Cruiser and flew the first hop in 1951, after which he established the AEC's airborne section. The first airborne spotting of anomalies outside of the AEC was done by Jim Rigg of Grand Junction, who bought one of the first scintillometers in 1951 for his personal plane.

Prominent in the whole picture is Harold Pabst's Monarch Aviation, Inc., at Grand Junction's Walker Airport. Clyde Davis, manager, told us Monarch sold 18 new planes in the last 12 months, 11 of them Cessna 180's and 7 Cessna 170's. Only 6 planes were sold in the previous 12 months. Some 35 lightplanes are based there now, as against 18 a year ago. Monarch keeps five charter pilots and planes busy, averaging 100 hrs. monthly on its charter ships in the summer. Rates are $24 hourly for Cessna 180's and $20 hourly for Cessna 170's. It operates rim flying for geologists and general transportation for the industry including air ambulance and cargo. Cargos include fuel for trucks, food for prospectors and machinery parts, a typical example being a 200-mile flight to rush a one-half-ounce spring for a drilling rig.

Rim flying is increasing. AEC wants all the uranium it can find — quickly.

Meanwhile, air activity has transformed the former wastelands into a busy panorama of working aviation. Not even the Indians pay much attention to low-flying airplanes any more. Clark Carr, who took us into the area's out-of-the-way places, learned this awhile back. He and his wife picked out an isolated desert floor to land their Bonanza for lunch out of a picnic basket on one of their weekend pleasure hops into the scenic countryside. Seeing a cloud of dust approaching over the horizon, they guiltily figured their landing had alarmed somebody and the dust was bringing unneeded aid and assistance. It was a truck carrying supplies but instead of stopping to learn the trouble, its crew just waved and hollered, "Howdy!", while driving away without even reducing speed. If Clark and his wife had been on burros the truck would have stopped to view the oddity. But an airplane — this was a common sight, a part of the wilderness itself.

★ ★ ★

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Questions and Answers for Airport Operators

What Has Happened to Personal Flying?

QUESTION: Mister, let me chime in with a question, too. What's happening to personal flying, general aviation or private flying, by whatever name you want to call it? I live in a city where twenty-five years ago or so there was more interest and enthusiasm for that type of flying than I can find now in any seven states. If it hadn't been for that interest and enthusiasm we little guys wouldn't have pounded the pavements getting out the vote for the first airport bond issue which built the small beginning of what is now our great municipal airport. You've seen it many times. It's the same airport from which we little guys are being crowded by heavy aircraft traffic, restrictions, lack of hangar space and high prices.

You never hear the little fellow mentioned in the news, whether it's press, TV or radio, that is, unless one of us runs into trouble somewhere. Yet big aviation makes the news daily. I'm not talking about the aviation press but the general news facilities. If industry, the airlines or one of the armed services needs a hangar we fellows call home, we're sunk. We can't pay the same money or provide the same payrolls. Gleaming executive aircraft crowd us out of hangars or force prices up to the point we move out anyway.

If we try to settle on a privately-owned field, we can consider our stay only temporary because our sprawling cities are over-running such fields or taxes and the encroachment of development are freezing them out.

If we fly home to see our country cousins we find the airport is bereft of its operator or if he is in business, he's away from the field and there is no one to gas us up. We see airports where everything seems to be jim-dandy, of course, but it does not seem to be the prevailing condition.

In our own city, I have appeared before the city council, I've pestered the city manager and I've wormed my way into meetings of the aviation committee of the chamber of commerce. But all these fellows seem to care about is the big stuff. I come away feeling like a mendicant because forty dollars a month to hangar a Luscombe is too rich for my blood.

All I want is a decent place to store my aircraft and from which to fly, all within my moderate means and in asking for it I don't want to be made to feel like a second rate citizen.

ANSWER: Among the principles of merchandising is one that helped build some of the big fortunes in America. It may have been overlooked or unrecognized by those who administer the policies of your town and your airport. Roughly stated it is the principle that no profit is too small to take if when added to the total profit it adds up to more money. Certainly there is a tendency on the part of many municipalities to weigh every action in relation to the profit and loss sheet.

We don't believe you are making a plea for subsidy. We think you feel that if you are willing to pay for simple accommodations at a rate that represents no loss to the airport you should be afforded that opportunity.

The heart of your trouble is storage space for yourself and others like you at prices within your means. Your needs and your demands don't make the news as do the million-dollar deals. Nor do they grasp the attention of your city officials or your non-flying neighbors. Air transportation is made up of all the kinds of flying from the smallest user to the biggest. Many cities do not recognize the dollar-a-month profit they can make from a T-hangar unit in the face of demands for high rental items. Instead they concentrate on high terminal income, landing fees and charges and construction of some magnitude. That's all right so long as they don't forget that the little fellow can be served too—at a profit if he can be given the kind of accommodations best suited to his needs.

The trouble you describe may be widespread but the cure in your case lies in your own town. After all, the officials who do or do not do the things you feel should be done are your own townspeople. There may not be enough of you to influence any election or appointment, but you certainly can make your voice heard. There must be others like you in your town with the same problems. Get them to work with you for what you all want. Go to your city officials then, but do not go purely with a complaint on your lips. Do as industry would do. If it's T-hangars you want, gather enough data to be able to state a reasonable estimate of cost, not some dream figure. Be able to show your city officials that the units you need can be built for so much, say $2,000 to $2,200 each. Show them that such buildings may reasonably have a life expectancy and an earning capacity for more than twenty years. Show them, too, that at $20 per month each unit will pay itself off in ten years.

Find a place on the master plan of the airport in which you can suggest they be built without interfering with that master plan and don't expect or demand that they be built on the most desirable commercial frontage on the apron.

If you are told that the city can't build for month-to-month rental because of the possibility of loss through protracted vacancy periods, consider offering to lease for one, two or even five years. You'll safeguard yourself against raises in rent during the term of any lease you make. If you aren't willing to go that far to guarantee a return on the city's investment you can readily see why city officials who aren't too familiar with general aviation would hesitate to commit themselves to the capital investment. Don't expect them to know what you and the rest of us know, i.e., that the vacancy rate of individual hangars is negligible if rents are reasonable and

NEW TERMINAL FOR LOVE FIELD in Dallas will have Y configuration, of single-level design. Ramp space for 21 DC-6's is provided. Moving sidewalks will reduce walking to and from planes.

Airmen's Calendar

Sept. 15—Pratt & Whitney-Airwork Corp. Fifth Annual Engine Operation and Maintenance Forum, Municipal Airport, Millville, N. J.

Sept. 19-21—18th International Northwest Aviation Convention, Hotel Vancouver, Vancouver, B. C.

Sept. 22—Pratt & Whitney-Southwest Airmotive Fifth Annual Engine Operation and Maintenance Clinic, Love Field, Dallas.

Sept. 25—Annual Spring Regatta, Philadelphia Aviation Country Club, Wings Field, Ambler, Pa.

Oct. 5-7—10th Annual Champion Spark Plug Conference, Secor Hotel, Toledo, Ohio.

Oct. 5-9—SAE National Aeronautic Meeting, Hotel Statler, Los Angeles.

Oct. 9-16—6th Annual All Texas Air Tour.

Oct. 13-15—Airport Management Conference, jointly sponsored by University of Oklahoma and AAAE, Norman, Okla.

Oct. 17-19—International Air Tour of Mexico, from Brownsville.

Oct. 27-29—National Business Aircraft Association Convention, Dallas.

Nov. 8-10—NATA Annual Meeting, Biltmore Hotel, Miami Beach, Florida.

MESSAGE TO AN ENGINEER THINKING ABOUT THE FUTURE— HIS FUTURE

Take a few moments now to review the progress of your career. Does your present position offer you a future that fully utilizes your creative abilities?

Compare your present assignment with the diversified, stimulating pursuits that increase the inventive challenge of Fairchild's team of qualified engineers. These men are working on engineering advances for the famous C-119 Flying Boxcar and the soon-to-be-produced C-123 Assault Transport. More than that, they are developing tomorrow's jet fighters . . . special reconnaisance aircraft . . . jet bombers and transports. The men at Fairchild know that *planned* project diversification keeps them in the forefront of the field of aerodynamics.

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You'll be investing wisely in a secure future if you take time today to write to Walter Tydon, Chief Engineer, outlining your qualifications. Your correspondence will be kept in strict confidence, of course.

ENGINE AND AIRPLANE CORPORATION
FAIRCHILD
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if field policies encourage ownership of aircraft.

When you present your case give them a few examples. Point out places near your home town where similar provisions are in existence. Point out El Paso, Texas, with more than fifty publicly-owned T-hangars and more under construction. Tell them about Hattiesburg, Mississippi, where Commissioner N. V. Carpenter showed us a row of ten nested T-hangars the city is building this summer. They'll be of concrete blocks for inner and outer walls and will have concrete reinforced trusses to carry the doors and concrete roofs.

The main thing to guard against in dealing with any situation such as yours is an attitude of hopelessness. Most municipalities move slowly and your needs may appear minute compared with other municipal problems such as vehicular parking and movement.

Attack any other problems that are pushing you around in the same factual way. Find out the way things are handled at other airports and cite those airports if that is the kind of handling you want. And don't get the idea general aviation is expiring. The emphasis may be shifting to other phases of aviation but general aviation and personal flying are healthy when the owners and pilots foster the public interest in that type of flying. The aircraft won't quit flying but their owners will if they get too disgusted.

Bird Grease Again

Do you by any chance remember a short item in this column in June, 1953, under the title of "One for the Birds?" It had to do with a report that Conoco Racelube, a grease, had been effective in keeping birds out of a hangar at Amon Carter Field, Fort Worth. Well, we saw it at work the other day in a hangar at San Angelo, Texas, where Dennis Humphreys pointed out small pots of the grease suspended in the high trusses. There wasn't a bird in sight.

We were over in Charlotte, North Carolina, in July and got a good look at the striking new terminal building there. It's a busy place and we had lunch with Dave Rea, the genial airport manager in the Dogwood Room, a mezzanine level dining room seating 240 people. The food was exceptional.

Operator Wanted

An operator is being sought for the airport at Andrews, Texas. We have been advised that a flying club with a total membership of 48 people has been organized and that at least 36 are potential students. A new hangar was recently erected on the field and it appears from a letter regarding the situation that there is an opportunity for a good operator at that airport. Contact J. M. Flemins, Chairman, Aviation Committee, Andrews County Chamber of Commerce, P. O. Box 85. Andrews, Texas. ★ ★ ★

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CESSNA TRANSPORT

(Continued from page 19)

will be true with his Cessna 620.

Describing the Cessna development, Harmon says the most important point in the undertaking is that the 620 is a completely integrated design — airframe and engines are being mated from the beginning, there being no antiquated designs or tooling or investments in either to justify or contend with.

As for the choice of flat engines, Cessna concludes that four of them offer a more practical package than two radial engines — from any stand point selected for argument, including weight and its distribution, drag, reliability, maintenance, cost and availability.

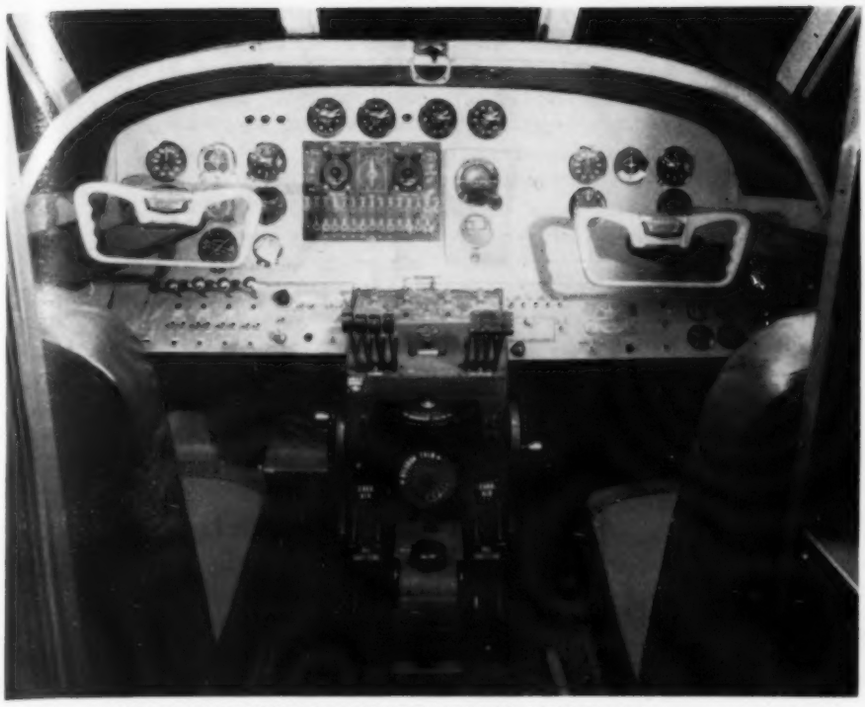
As for aircraft size, Harmon has spent several years studying and analyzing all sorts of surveys and data related to executive aircraft utilization. He figures the average load is only 3.8 passengers in multi-engine business planes and the average trip length is only about 485 miles. Aircrafters can design all around such figures and come up with a wide assortment of transports. But Cessna chose to seek a middle-of-the-airways design, settling on an 8-to-10-place cabin and a range of some 1,200 miles as the basis of their Model 620 to meet most needs, rather than go to extremes in bidding for a specialized market. The 250-mph. cruising speed seems low, but 300 mph. for such an airplane would push the cost up to $500,000 or more, it is believed.

It is interesting to note, in connection with this, that there is a sizeable "replacement" market potential in the 1,900 or so multi-engine business planes now flying. These include some 1,100 Beech D18's, 350 Lockheed Lodestars, 300 Douglas DC-3's, 70 de Havilland Doves and a score or more of other designs.

Design Philosophy

Uppermost in Harmon's design philosophy has been a desire to make the Model 620 as complete a transport for business needs as possible. Its features reflect a lot of thoughtful planning based on comments from pilots and Harmon's own knowledge of multi-engine operation requirements. For example, the engines are installed as four completely isolated power packages with no interconnections — they represent a "multiple failure design philosophy." In other words, emergency action in event of any single engine becoming inoperative can not affect operation of the other three engines. This is provided through design of electrical, hydraulic, fuel and control systems.

Careful planning has resulted in an instrument panel remarkable for its simplicity and freedom from clutter. It is in three components from left to right, having flight group on the left, radio and navigation group in the center and duplicate flight group on the right. Radio and navigation equipment is a major component in instrumentation. Engine instruments are on a sub-panel overhead but forward of the crew, and with them is an ingenious panel for emergency controls more intimately known and respected as "the panic panel." This features four separate groups of switches and levers, one group for each engine. If an engine fire develops, a light on the main panel flashes as a warning. A glance above can quickly identify which engine is affected, for the fire detector simultaneously illuminates one of the four emergency panels, which are located adjacent to corresponding engine instruments for quick reference. By moving a single lever on an engine group, the pilot cuts the ignition to that engine and feathers its propeller. As rotation stops, further movement of the single lever past a detent shuts off at the firewall all services to the particular engine involved — hydraulics, fuel, and anti-icing fluid. A third movement on the same individual engine panel operates a selective fire extinguishing system.



UNITIZED INSTRUMENT PANELS FEATURE CESSNA MODEL 620 transport design for executive flying. Photo shows mock-up of the roomy cockpit. Main instrument panel has flight instruments at left and at right, with radio and navigation controls and gyros in center. With exception of manifold pressure indicators and tachometers, all engine instruments are on an overhead panel (not shown) in front of crew.

Below the main instrument panel is what Harmon calls the "primary" board, having all necessary switches for starting up. This was designed to simplify the check-list so necessary in a multi-engine airplane. First on the

new **ARC** course indicator puts two instruments in ONE!

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Now users of the light, compact A R C Type 15D navigational receiving equipment can employ a single panel instrument that performs the work of two units previously used. The cross-pointer meter and the course selector have been combined into one part that fits a standard 3⅛" instrument hole. This saving in instrument panel space is important, particularly now that dual VOR installations are so popular. In addition to the space saving, installation costs are cut.

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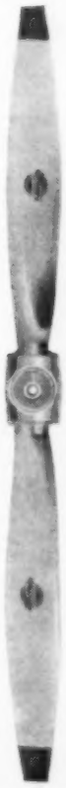

The MET-L-MATIC propeller is unique in its class particularly because of its design details, which greatly *reduce maintenance costs*. Only the MET-L-MATIC propeller features a separator which prevents the balls of the main blade bearing from rubbing against one another. Bearing failures due to chafing and galling are eliminated and bearing friction is greatly reduced. As a result, the pitch change is *smooth and surge*-free. And the savings effected in bearing maintenance far exceed the slight initial cost of this separator in the MET-L-MATIC.

Check these features

- *Sealed-in, factory-lubricated, pitch-changing mechanism.*
- *No pitch-changing parts exposed to weather.*
- *Hydraulically operated. Holds RPM accurately without wavering or surging.*
- *Forged Aluminum Alloy hub and blades for high strength—low weight.*

• *You fly with CONFIDENCE behind a Met-L-Matic propeller*

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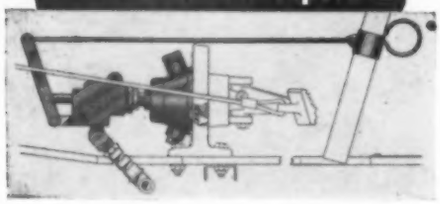

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procedure is a lock, with key, for activating the panel. Next come four fuel controls, which are really idle cut-offs. Then come switches for electrical system, anti- and de-icing, windshield wipers, ice lights and pressurization. Control head for pressurization is located on the co-pilot's side.

Engine, propeller and fuel system controls are located on a compact pedestal console between pilot and co-pilot. Interesting is the absence of mixture controls, mixture being automatically controlled at the carburetors.

With the fuel system controls is a complete diagram of the fuel system showing fuel arrangement and flow in relation to switches and valves. Also with it is a remarkable fuel capacity indicator arrangement. The Model 620 will use capacitance-type fuel gauges which give continuous readings in both pounds of fuel remaining at all times and percentage of capacity remaining. For example, the gauge will normally read 2,400 lbs. with tanks full at 400-gal. capacity, or 1,800 lbs. and three-fourths capacity when 300 gals. remain, 1,200 lbs. and one-half with 200 gals. aboard and so on, with in-between readings at all times. Readings on each tank are available by pressing a button.

In line with latest safety design practices, all fuel tanks are located outboard of the inboard engine and all interior wing tanks have bladder cells, with wing-tip tanks adding to the interior capacity as standard equipment.

Pressurization Highlights

The AiResearch cabin pressurization equipment is installed in the fuselage behind the cabin. It is a turbine using fuel from the aircraft's regular fuel tanks. This is piped from the wing outside of the passenger cabin alongside the exterior skin on the starboard side. The turbine has been rated downward considerably from its normal power capability, this being a 100-hp. unit rated down to about 45 hp. It will consume from about 30 to 75 lbs. of fuel per hour, depending on the load imposed on the unit.

Harmon and his engineers have constructed a welded box of heavy steel large enough to accommodate a full-size cabin fuselage section for their pressurization experiments. In this steel box they fabricated bulkheads, skin and windows of various thicknesses and design detail. At each step, a large vacuum pump was used to evacuate the steel box, thus loading the cabin section with the equivalent pressure required for flight operation.

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It was a trial and error process, and as air leaks developed, they were corrected. In this way, the group perfected cabin structures, provisions and seals which will withstand 7 lbs. per sq. in. pressure differential. Maximum differential in actual flight operation of the Model 620 will amount to only half of that — 3.5 lbs. per sq. in.

Cabin windows are picture type — they measure a generous 16 by 30 inches and are the largest to be found in any new-production air transport today. These windows are 9/16ths of an inch thick. They are bolted in place. Up front, the cockpit windshield is 9/16ths safety plate glass and exceeds bird-proof strength requirements.

The cabin pressurization system meets air carrier requirements and features air carrier operating features, just as do commercial airline systems.

Cabin Features

An innovation in the cabin is the use of metal runners extending the length of the cabin, being notched in ½-inch spaces. Passenger seats are fitted to notches in the runners and can therefore be spaced in any desired manner. They can all be removed or installed in only 10 minutes. These seats are full airline size and are fully reclining. They also are designed so that the seat backs can fold forward. Seats and floor structure will withstand loads in excess of 10 G's. Cargo tie-down rings fit the same notches.

A wash room with door for privacy is provided, as is a food and refreshment galley with refrigerated box and running water. A large baggage compartment is in the pressurized area for access during flight. The cabin door has a built-in stair.

Air carrier-size racks for radio and electronic equipment, just aft of the pilot, are also pressurized and have provision for 275 lbs. of equipment. In addition, there are large compartments for special equipment installation in the nose with doors of large dimensions.

The Model 620 flaps will be electrically operated and its tricycle landing gear will be hydraulically operated but has an auxiliary manual system.

Since it is designed for all-weather operations, standard equipment will include the latest type high-pressure leading-edge de-icing boots for wing and tail surfaces as well as propeller anti-icing equipment.

An interesting phase in the Model 620 project was wind tunnel testing in which Harmon and his engineers used an elaborate 7.5-ft. scale model of the 4-engine airplane. This work was done at the tunnel operated by the University of Wichita. Virgil Razek is director of the wind tunnel.

"We have designed Model 620 around the needs of corporation executives as we know them," Harmon summed up. "Flying in maximum safety and comfort has been the determining factors behind our design philosophy. We believe this airplane will introduce entirely new standards.

"We have also designed for those developments which can be anticipated in the foreseeable future — this is a basic airplane intended for a long-term useful life. While jet engine progress has been remarkable in recent years, it remains a fact that most of this progress has been concerned with jet engines of a size far beyond the transport category of the Model 620. Jet engines in this category have not been developed commercially. On the other hand, piston engines and accessories of the type we will use are backed by millions of hours of everyday commercial operation and have proved their integrity beyond any question."

Harmon says the welcome mat is out at Cessna for executive transport pilots and their bosses who may want to see his Model 620 cabin mock-up. It is a safe bet that hundreds will be taking him up on the invitation. ★★★

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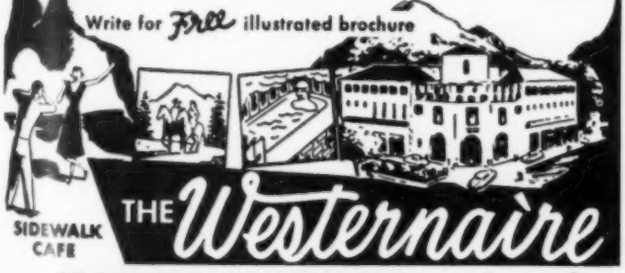

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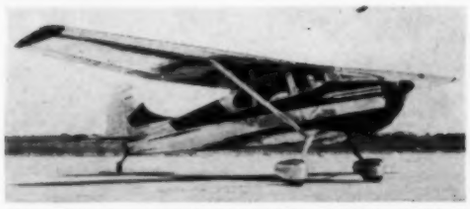

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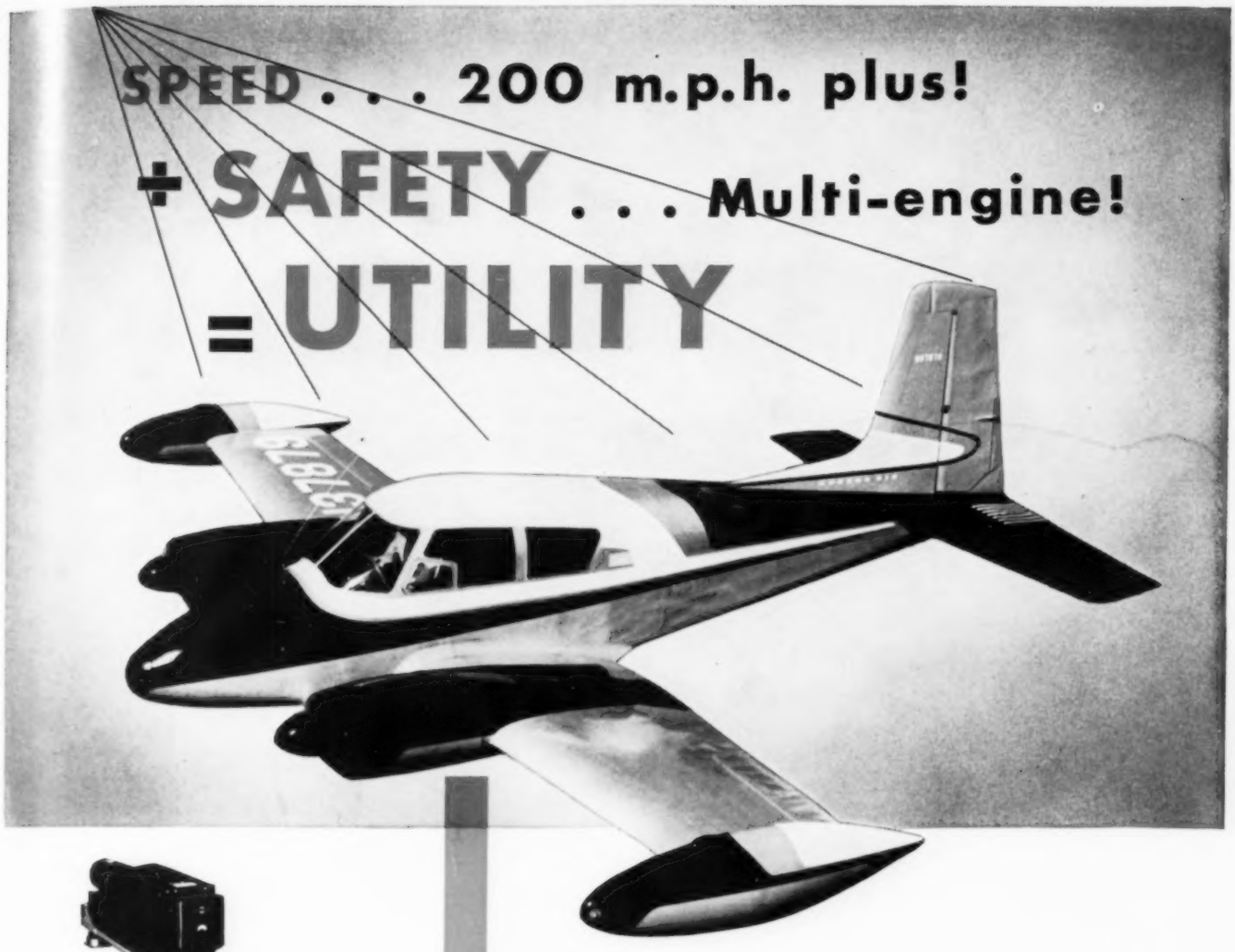

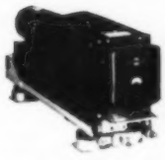

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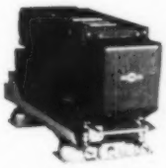

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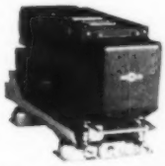

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